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BUD ROT.

It would appear that a definite conclusion as to the causative organism of Bud Rot of the coconut palm has at last been arrived at. We reprint in this issue under the caption 'Plant Diseases and Pests Notes' an extraordinarily interesting paper on the subject by Otto A. Reinking which appeared in Vol. XIV. No. 1 of The Phillipine Journal of Science.

Careful and painstaking research by this scientist has established the fact that, in the Phillipine Islands at least, bud rot is primarily due to the parasitic fungus known as *Phytopthora faberi* Maubl. This particular fungus is also known to cause black rot of cocoa pods and similar rots on other fruits.

This same fungus is only too well known in British Guiana and was included in a list of parasitic fungi which was drawn up by the late Mr. C. K. Bancroft*. There is little doubt that a careful scientific investigation here will prove a similar relationship.

It is interesting to note the recommendations which this author gives ; it will be observed that among them are those time worn yet indispensable ones of clean cultivation and adequate spacing of the trees.

In this country it is high time that this valuable plant—at present more valuable than ever before—should receive some recognition of its services in the past. To many of us the coconut palm is a very real friend—a friend in need.

*Journal of the Board of Agriculture of British Guiana. Vol. xi. No. 1.

It behoves us consequently to occasionally clear away the superabundance of rank vegetation which encumbers and competes with its rooting system, to give it a little mulching at times, a little more drainage (if such exists) and, when disease appears take prompt action. Bud Rot in a plantation of young trees necessitates immediate action otherwise, in a short time, there will be seen that most depressing spectacle of tree after tree drooping its disease and yellow central shoot, followed in succession by the lower branches. No malady is so deadly to coconut palms in British Guiana.

BRITISH GUIANA TIMBERS.

By L. S. HOHENKERK, Forestry Officer, Lands and Mines Department.

In the following list an attempt has been made to give, as shortly as possible, all the information available with regard to 60 timber trees of British Guiana. It is hardly needful to say that there are more than 200 other different kinds of woods in our forests about each of which little, or nothing, is known.

The Crown Forests are estimated to cover about 78,000 out of a total area of 89,500 square miles, and between 11,000 and 12,000 square miles of these forest lands are in the easily accessible portion of the Colony i.e., between the Sea Coast and the falls in the various rivers.

It is estimated that the number of trees of all kinds covering an acre of land in ordinary forest conditions would average about 133 with girths of 18 inches and upwards and an average girth of 37½ inches. These figures are averages taken from about 200 sectional surveys covering various classes of forests from swamp to hill lands. It must be understood that no allowance has been made for defective or hollow trees and the figures given should be considered a maximum.

The suffix, "balli," so often found in the Arawak (Indian) names of trees means "resembling." It is used by the Indians in cases where trees take their names from others which they in

some way, resemble either in colour, odour, appearance of leaves, flowers, fruit, wood or bark, (e.g. Balata-balli, resembling the Balata tree). The heartwood of a tree is called by the Indians a "tacuba," but this name is also generally applied to fallen trees of a hard nature.

The information has been tabulated systematically under each name and has been compiled from the following authorities, viz., (1) Catalogue of the woods of British Guiana suitable for cabinet making, Park and Cunningham, 1886; (2) Catalogue of the exhibits of British Guiana prepared for the World's Columbian Exposition, Chicago, 1893; (3) A list of woods (Institute of Mines and Forests, British Guiana) forming Appendix II. to the British Guiana handbook of general information, issued by the Government, 1903; (4) Timbers of Commerce by Herbert Stone, F.L.S., F.R.G.I., 1904; (5) Report by A. G. Bell, M.I.C.E., Colonial Civil Engineer of British Guiana, 1906; (6) The timbers of British Guiana (being a report on Bell's collection) by H. Stone and W. G. Freeman, D.Sc., 1914; (7) Reports (general and detail) on the Forests of British Guiana by C. Wilgress Anderson, I.S.O., F.G.S., F.R.G.S., late Government Forestry Officer, 1912; also reports by the Imperial Institute, London, and information in the Forestry Branch of the Department Lands and Mines, British Guiana.

Recent identifications of botanical specimens collected by the late Forestry Officer by the Authorities at Kew, London, have been added. They are shown thus:—" (Kew, 1918)."

Two tables of mechanical tests of various woods are attached.

1. ARAMATA. *Diplotropis brachypetalum*. Tul.,

Natural order, Leguminosae.

Greenish—to dark brown colour with lighter brown; a handsome close grained wood; darkens considerably on exposure; surface dull except in radial section. Sapwood oatmeal colour, well defined. Wt. 50¼ lbs., S.G. 0.8; grade 6 firm compare Teak, Walnut, smell little, taste slightly cedar like.

Planes and turns hard, takes a fine polish, makes excellent and durable furniture, used for building boats and house frames. No. per acre: 0.6 in North West, 5.29 Esse:, 11.81 Dem:

4.98 Berbice, and 2.5 Courantyne Rivers. Logs can be had 30 ft. by 10 to 12 ins. square free of sap; Indians use a decoction of the bark to destroy vermin.

2. ARISAURU. (Yaksauru in Canje R.) *Vataireа guianensis*. Aubl. N.O. Leguminosae.

Yellowish light brown to dark brown or rich brownish red colour; coarse, open grain, well defined; darkens a little on exposure; surface lustrous. Sapwood oatmeal colour, well defined. Wt. 44¼ to 46¾ lbs., S.G. 0.75 (mean); grade soft, compare Pine, Birch; smell (dry) none; taste bitter like Habana Cedar.

Planes fairly easily and smoothly, turns well but grain too open to make good work and for some reason troublesome to polish. Well suited for decorative work, furniture; durable and not attacked by worms (except sapwood), used chiefly for planking ships and recommended for estates' kokers.

No. per acre: 1.7 North West, 1.3 Esse;, 4.7 Dem: 2.9 Berbice Rivers. Logs can be had 40 ft. by 12 to 14 ins. square free of sap. A decoction of the bark used for dressing ulcers and the sap is a remedy for ring-worm.

3. ASSAPOKO.

N.O. Sapotaceæ (?).

Light brown or yellowish brown, uniform colour; fine grained and compact; darkens a little on exposure; surface bright to lustrous. A sapwood tree? Wt. 64 lbs., S.G. 1.01; grade 4, hard, compare Hornbeam, Yew; smell none, a little when being worked; taste none.

Planes easily and well, turns hard and indifferently well, polishes well. Durable, suitable for house framing. No. per acre: small in all the districts. Logs can be had up to 30 or 40 ft. by 9 to 12 ins. square. Bark has a sticky white latex. Fruit edible, resembling the star-apple. Other varieties of this tree.

4. AWASAKULE or Assakole

Reddish brown to chocolate brown, when polished like a dark walnut; close grained; darkens a little on exposure; surface bright. A sapwood tree? Wt. 59 lbs., S.G. 0·94; grade 6, firm, compare Teak. Smell or taste none

Planes and turns hard and badly, polishes well, good for inlaying; house framing; the Indians use it for building. No. per acre: 0.19 North West, 4.3 Esse:, 1.3 Dem: 2.5 Courantyne Rivers. Logs up to 25 ft. by 8 to 12 ins. square. The roots which grow out of the tree several feet from the ground are used by Indians as ram-rods for their guns. Bark has a sticky yellow sap.

5. BALATA TREE. (Bullet tree, Burue, Koberu). *Mimusops globosa,* Gaertn. N.O. Sapotaceae.

Deep reddish-brown colour; moderately fine grain; darkens a little on exposure; surface bright. Sapwood brown, sharply defined. Wt. 55¼ to 73½ lbs., dry, (83 lbs. green), S.G. 0.88 to 1.18, mean 1.02; grade 1, excessively hard, compare Ebony. Smell when sawn, little but curious; taste none; solution deep crimson.

Planes hard but well, turns well both by hand and machine, takes a good polish with little trouble. Most durable in exposed places; used for wind mill arms, posts and architectural work, upper portion of trunk and branches useful for making shingles, wheel-spokes, paling staves, etc. For bridge piles in fresh water said to outlast greenheart. Said to be of little use for ship building as it is attached by teredo and worms, but R. Spruce, in Notes of a botanist on the Amazon States that the Brazilian Frigate "Imperatrix" built at Para in 1823 chiefly of "Masseranduba" (the cow-tree or balata tree) was in 1849 still perfectly sound and sea worthy. It is a well-known, marketable wood of considerable value. For tests of strength and elasticity see table 1 attached. Fairly plentiful in Colony; plentiful in Canje River 8 to 9 per acre, Courantyne, 4.9. Average height 100 ft. or more and it has been known to square 42 ins. free of sap. **This tree is not allowed** to be cut from the Crown Forests without the written permission of the Commissioner of Lands and Mines.

The bark is used medicinally by Indians and occasionally as an emetic. It yields a latex when tapped which on drying forms the balata of commerce, estimated at 4 lbs. per tree on first tapping, subsequent tapping being less. Balata is used in

many industries as a substitute for gutta-percha, for machinery belting, boot soles, etc.

The fruit is edible, grows to size of an English cherry and resembles in taste the sapodilla. From the kernels oil can be extracted.

From inspection of estates in Canje River it would appear that trees up to 45 ins. girth have grown since abandonment of cultivation, over 70 years ago and that a tree of 42 ins. girth would be about 66 ft. in height.

6. BALATA-BALLI (Barta-balli.) Probably. *Lucuma sp.*. N.O. Sapotaceae?

Brown to reddish-brown, uniform colour; fine grained and compact; darkens slightly on exposure; surface clean. Apparently a sapwood tree. Wt. 56½ lbs., S.G. 0.90; grade 4, hard, compare Yew. Smell or taste none.

Planes and turns moderately easy and well; polishes indifferently; a wood of good appearance and quality. Used for partition boards, doors etc, for houses and for furniture. Scarce in some districts but fairly plentiful in others; Courantyne River 9.8 per acre. Tree averages about 90 ft. in height and logs can be had to square 20 ins. Yields a latex in great abundance; sometimes used for adulterating balata. Latex dries brittle and up to the present is of no commercial value. Fruit, called the Marmalade fruit or Ducally apple, is one of the best produced by our Forest trees; season about April. This tree must not be confused with Barada-balli.

7. BANIA.

A deep purple to black uniform colour; close grained; darkens but little on exposure; surface bright. Sapwood oatmeal colour, sharply defined. Wt. 77 to 84½ lbs., S.G. 1.253 (mean); Grade 2, extremely hard, compare Boxwood, greenheart. Smell and taste when dry none.

Planes hard and badly, turns hard and indifferently, takes a mediocre finish. Suitable for walking sticks, rulers, inlaying and small furniture. A valuable wood for turning and Tunbridge Ware. It is not common. Can be had in lengths up

to 30 ft. but, the stem being deeply fluted, in only small sizes, otherwise this wood ought to rival ebony. The foliage and bark of the tree resemble the guava (Psidium sp.)

8. BRITISH GUIANA MAHOGANY. (Crabwood).

Carapa guaniensis, Aubl. N.O. Meliaceae.

A reddish-brown wood resembling Mahogany; moderately coarse and open grain; darkens a little on exposure; surface lustrous. Sapwood paler in colour not well defined. Wt. 38½ to 46¼ lbs. dry (green about 52 lbs.) S.G. 0.62 to 0.792 (0.694 mean); grade 6 to 7, firm to soft, compare Teak to Pine. Smell when dry none: taste slightly astringent.

Planes easily but indifferently; turns well by hand and fairly well by machine; polishes well to a walnut rather than a mahogany colour. "Though as truly a mahogany as the "majority of the woods sold under that name, would pass better "as a walnut, from which it is scarcely distinguishable when "oiled" (Herbert Stone). It is the most popular furniture wood in British Guiana; also used for house-building (outside and inside work), fencing, ship-building, making canoes, masks and spars, on account of its toughness, mill and mortar beds. For tests of strength and elasticity see tables attached. No. per acre 3.5 in North West, 1.7 to 5.9 Essequibo, 1.1 Berbice, 3.7 Canje and 8.9 Courantyne Rivers. Logs up to 40 ft. by 10 to 14 ins. square.

The bark is used for tanning; on being cut it gives a gum which looks like gum animi but is much softer.

The kernel of the fruit yields the well-known crab-oil (called Andiroba in Brazil), used medicinally and otherwise. There are 2 or 3 varieties of this wood; the above information applies to the red variety; the white is lighter in colour and somewhat finer in grain and the S.G. is said to be less; a third variety is said to have a much higher S.G., greater than that of water; this variety has a smooth bark, the others a rough, scaly bark. British Guiana Mahogany or Crabwood must not be confused with Caraba-balli (*Guarea trichilioides,* Linn.). Wt. 59 lbs. S.G. 0.95, grade 6, firm, which is of lighter colour than the white variety and of rather coarse grain.

9. BUHURADA. (Boockhoorada)
Parinarium campestre, Aubl N.O. Rosaceae.

Yellowish to light mahogany, uniform colour; close grained; darkens but little on exposure; surface bright. A sapwood tree? Wt. 54 lbs., S.G. 0.86 to 1.055 (mean 0.946); grade 2, extremely hard, compare Boxwood. Smell none; taste little, like cedar.

Planes moderately hard but well; turns hard and badly; polishes well. Suitable for furniture and an excellent wood for beams, rafters and plates of houses. Not plentiful, North West 1.5 and Canje River 1.02 per acre but stated to be common throughout the Colony. A large tree having a large crown with reddish-brown leaves. Not well known and little used. Logs up to 40 ft. squaring 12 to 14 (or 20) inches.

There is another tree of same name and Natural Order which has recently been identified as *Licania Kunthiana,* Hook. F. (Kew 1918).

10. BURADA. (Buruda).

Colour golden-brown; straight; but not very close grain. S.G. 0.836 to 0.905; easily worked and polishes well. (Information with regard to this wood is scant. It may be a lighter variety of Buhurada but it is possibly Bouragie Silverballi, q.v., as under this name the information about the specimen No. 13 sent by A. G. Bell and reported on by Stone and Freeman, has been included.)

BULLET TRE see Balata Tree.

11. CEDAR, RED (or Kurana). *Cedrela odorata,* Linn.
Icica altissima, Aubl. ? N.O. Meliaceae.

Reddish-brown colour; grain fairly coarse. Sapwood, very little of a lighter colour. Wt. 24½ to 34¾ lbs. S.G. 0.40 to 0.56. Grade about 7, soft. Handsome, serviceable and valuable; works well and takes a good polish. Used for cigar boxes, furniture and coffins; recommended for wainscotting rooms, for chests, inside work of clothes presses and drawers as vermin are not known to breed in it; should be an ideal wood for canoes and punts. For mechanical tests see table 11, attached. Found all over Colony but scattered, in North West 0.9 per

acre. Logs can be had 40 feet squaring up to 20 ins· and even larger.

There is a variety of Cedar with lighter colour and finer grain· Must not be confused with White Cedar or Warakuri for which see.

Corkwood see ITIKIBOURA, under ITIKI-BOURA-BALLI·

CRABWOOD see BRITISH GUIANA MAHOGANY

12. DAKAMA. *Dimorphandra latifolia*, Sul.

N.O. Leguminosae.

Rich, red uniform colour ; coarse grain ; darkens considerably on exposure ; surface bright. Sapwood light brown, ill defined. Wt. 65½ to 66½ lbs., S.G· 1.05 ; grade 4, hard, compare Yew. Smell when dry none, taste flat.

Planes and turns hard, polishes indifferently. A handsome wood which may find a market for furniture ; said to be a splendid building wood. Plentiful in some districts of the Colony. Logs up to 30 ft· squaring 12 to 24 inches.

13. DAKAMA-BALLI. *...ue americana.*

N.O Leguminosae.

Yellowish-brown to reddish-brown colour with a pretty golden grain : weight 48 to 56 lbs., S.G. 0.78 to 0.91 ; grade, hard.

Takes a fine polish ; makes good furniture and handsome panelling, though little used. Plentiful in some districts, Essequibo River 12.1 per acre. Average height 80 ft., and will square 20 inches. Bark used for tanning·

" From the seeds a starch is made which is very efficacious in cases of dysentery and diarrhoea.' In times of famine this starch is mixed with decayed wood by the Indians to make a kind of bread.

14. DALLI. *Myristica surinamensis, Roland.*

Virola surinamensis, Warl· Kew, 1918). N·O. Myritaceæ.

Uniform reddish-grey or dirty white colour; coarse grain ; lustrous, surface brilliant on a cleft section. A sapwood tree. Wt. 29 lbs·, S.G. 0.36 to 0.46 ; grade 7, soft, compare Pine. Smell none, taste flat.

Planes badly, strips of wood rip out exposing the silver grain in a most unusual manner ; turns easily but badly ; unsuitable for polishing. Used for match boxes and cheap coffins and if thoroughly cured for inside boarding. No. per acre 2.1 North West ; 5.8 Esse:, 16.93 Dem:, Canje 0.4.

The seeds are about the size of a small marble and contain 60.53 per cent. of fat which is solid at ordinary temperatures and has an agreeable taste and little, if any, odour. Readily extracted by hot pressing or by solvents ; used for making soap and candles. (Board of Agriculture Journal, Vol. II. No. 1, 1908).

Note:—In Kaituma R., North West District, 2 kinds of Dalli trees have been noted which, though similar in external appearance, differed by one being a sapwood tree and the other having a red-brown heart and a distinct light-coloured sapwood. Must not be confused with Hill Dalli or Killikowa, which is a red-brown colour, coarse grain surface like watered silk, brilliantly lustrous, 44½ lbs. S.G. 0.71 Grade 7, soft.

15. DETERMA. (Tetruma), *Nectandra sp.* (*N. Wana ?*) N.O. Lauraceae (Kew 1918).

Pinkish-red uniform colour, resembling cedar; coarse grain; darkens a little on exposure; surface dull to glossy. Sapwood oatmeal colour, well defined. Wt. 35½ to 37¼lbs., S.G. 0.58. Grade 6, firm, compare Beech ; smell and taste none. Planes indifferently but moderately easily ; finishes badly. Used for planking boats, railway carriages and other purposes where a light and strong wood is required ; for masts and spars of vessels, the largest spars procurable in the colony are of this wood, from 70 to 90ft. long and 14 inches in diameter at smaller end. A log has been seen 42 inches square. For mechanical tests see table II attached. Logs procurable 30-40 ft. by 12-16 inches.

Fairly plentiful in some parts but generally scattered.

16. DUKA. *Tapirira (near) Guianensis,* Aubl. N.O. Anacardiaceae.

Pinkish or light brown colour resembling inferior Mahogany or cedar ; there is a tendency of the pores to bleed and make minute stains upon the surface ; darkens slightly on exposure ; surface lustrous. Sapwood oatmeal colour, not defined. Wt.

35¼ lbs., S.G. 0.48 to 0.56, grade 7, soft, compare Pine. Smell slight, but not like cedar; taste none. Planes easily and well, turns indifferently, polishes well. Useful for indoor house work, tables etc., might be suitable for 2nd grade cigar boxes. No. per acre 0.24 North West, 2.3 Dem: and 0.57 Canje Rivers. Logs up to 40 ft. squaring up to 17. inches. There are 2 or 3 kinds. Fruit edible resembling a purple grape when ripe. Not to be confused with Dukalli. For mechanical tests of Dukalli see table II. attached.

17. DUKALLI-BALLI. (Dukala-balli.)

Dark brown colour, a purplish tinge at times; fairly close grain; darkens but little on exposure; surface bright. Sapwood yellowish white, sharply defined. Wt. 47¾ to 56½ lbs., S.G. *0.76 to 1.01 (mean 0.90)*; grade 2, *extremely hard, compare* Boxwood. Smell or taste none. Planes and turns moderately hard and well; polishes well. Durable, makes handsome furniture, was formerly used for bed posts, suitable for cabinet work and inlaying. Not common. A tree growing to a height of 120 ft. and squaring 20 ins. free of sap.

18. DUKURIA. (No. 1.)

Yellowish white colour resembling white pine; surface bright (not brilliant). A sapwood tree? Wt. 33¼ lbs., S.G. 0.53; grade 8, very soft. Taste and smell none. Works easily but badly, not suitable for polishing. Uses much the same as Dalli. Scattered and not plentiful, Canje, 2.63 and Courantyne 0.5 per acre. Reported to be growing plentifully on low lands of Demerara River. Tall trees, logs squaring up to 16 ins.

Note:—There are 2 kinds of Dukuria reported, with small and large leaves. The above information which has been taken from the reports of Bell, Stone and Freeman is so different to that of other authorities that the latter has been placed under a separate head.

DUKURIA. (No. 2.)

Brown, rather darker than greenheart and if anything closer grained. S.G. 0.96 to 1.02. Takes a fine polish, the same as greenheart and it is difficult to distinguish the 2 specimens. Durable; makes good furniture and much used for house frames.

Trees grow to a height of 90 ft. logs 20 to 50 ft. and squaring 2 to 16 ins. free of sap. Plentiful throughout the Colony nd grows in dry soils.

EDA-BALLI or Wild Calabash see under ITE-BALLI.

19. EURI-BALLI. (Yura-balli, Hura-balli).

Brown to reddish brown colour, superficially resembling Mahogany; close grain; darkens but little on exposure; surface clean. Sapwood oatmeal colour, sharply defined. Wt. 49½ to 52¾ lbs., S.G. 0.79 to 0.84; grade 3, very hard, compare Blackthorn. Smell or taste none. Planes badly, takes a fine polish. A very handsome wood most suitable for furniture and largely used by cabinet makers; excellent for planking craft. Readily procurable in logs up to 30 ft. squaring 12-14 ins. For mechanical tests see tables attached.

The bark has an odour resembling balsaam capivi; used by natives for dressing sores. There is another variety with darker coloured wood of similar S.G.

20. FOTUI. (Futi, Phootee).

Dirty colour resembling white pine ; coarse grain ; darkens but little on exposure ; surface malt. A sapwood tree. Wt. 20¼ to 26¾ lbs., S.G. 0.33 to 0.43; grade 8, very soft, compare white pine. Smell or taste none.

Planes easily and well, turns easily and badly, unsuitable for polishing. For mechanical tests see table II. attached. No. per acre 0.27 in North West, 1.4 to 17.26 Essequebo, 1.5 to 1 Demerara, less in other districts.

21. FUKADI. (Phokadie.)

Brown colour with a greenish tinge at times, somewhat resembles greenheart ; grain coarse and open ; darkens but little on exposure; surface clean to bright. Sapwood brown not defined. Wt. 57¼ lbs., S.G. 0.92 ; grade 3, rather hard, compare Blackthorn. Smell or taste, none. Planes and turns hard and badly, polishes indifferently. Used for house-framing; durable for indoor work, should make good sills ; at present little used. Plentiful, generally, in Esse : and Dem : Rivers. Logs up to 30 ft. squaring up to 14 ins.

22. GREENHEART. (Bibiru, Sipiru). *Nectandra Rodioei*, Hooker. *N.O. Lauraceae*

Ocotea Rodiei. Mez. (Kew 1918).

(1) Dark yellowish-brown and (2) brown both with a more or less pronounced greenish tinge, (3) dark brown almost black; with prominent light green pores, which give the wood a cane-like appearance ; coarse grain; darkens on exposure; surface lustrous and cold to the touch. Sapwood ill defined. Wt., 58 to 75 lbs. dry, green about 72½ to 81 lbs., S.G. 0.94 to 1.23 ; grade 2, extremely hard, compare Boxwood. The wood is found in all gradations of colour from greenish-yellow to black and its value increases proportionately as the colour deepens. The lighter colour is of less S.G. 0.935 to 0.951 and the black 1.098 to 1.210. McTurk states there are 3 varieties, viz., mainap, yellow and black ; with regard to the last 2 it is not quite certain whether they are distinct varieties (although this would seem to be the case) or whether the black wood comes from more mature trees. The timber is generally straight-grained and sound, and remarkably free from knots due to its naturally clean bole.

Planes well, turns hard and badly, takes a good polish and looks well. It is already familiar in foreign markets and is rated first class at Lloyds'. Said to be the best timber for resisting tensile and compressive strains. " The truly remarkable " lasting qualities of mature greenheart wood have given the tree " a world-wide reputation. Authentic records show that the " best grades surpass iron and steel in durability when placed in " water or in contact with the soil. This extraordinary freedom " from decay is due in part to the presence in the wood of an alkaloid known as biberine, and in part to the presence of resin- " ous substances known as tyloses." (C. D. Mell, Assistant Dendrologist and W. D. Brush, Expert, U.S.A., 1918). Said to be the strongest timber in use, with a crushing strength of 12,000 lbs. per square inch. 65 per cent. greater than that of English Oak. Unsurpassed as a construction timber ; chiefly used in ship and dock building, especially for keelsons, beams, engine bearers, planking, dock gates, lock gates, piers and piling; also used for trestles, bridges, shipping platforms, cellar flaps, flooring, waggons, carriage shafts, mill-timber, house-frames, fishing rods. It resists the attack of wood-ants on land, and in water the heart-wood is proof against the ravages of the teredo;

it is therefore peculiarly adapted for submerged works of all kinds. Every wharf in the port of Georgetown, British Guiana, a distance of nearly 2 miles, is built on greenheart piles. Piles at Glasgow and Leith, Scotland, are sound after 60-80 years' service. Gates at the Canada Loch, Liverpool, England, were in service 38 years, were enlarged in 1894 and the same timber used, and still in service after 18 years additional use. Greenheart has been similarly used in the West Indies, India, South Africa, Suez Canal, Holland, Belgium, France, Buenos Ayres and in the Panama Canal. Nauseu's ship, "The Fram" and the Antarctic ship "Discovery" were constructed of greenheart. It is highly esteemed as a furniture wood. The ends of logs removed in the woods are used for such articles as automobile spokes, belaying pins and tobacco pegs and for all kinds of turnery. For mechanical tests see tables attached.

A very slow growing tree; specimens 70 years old are scarcely 8 inches in daimeter. One of the tallest forest trees. Logs can be had 70 ft. long and squaring 18-24 inches or more. Greenheart is becoming rather scarce below the falls in the different rivers; above the falls there are large Virgin Forests* From bark and seeds biberine is extracted (discovered by Dr. Rodie of Demerara in 1834), used as a substitute for cinchona. The Indians use the seeds medicinally in cases of diarrhoea.

23. HACKIA. (Iron-wood.)

Uniform brown colour, finely shaded with lighter brown; solid and close grained; darkens a little on exposure; surface bright, cold to the touch. Sapwood light brown or brownish-white, sharply defined. Wt. 81¼ lbs., S.G. 1.215; grade 1, excessively hard, compare Lignum-vitae. Smell or taste none. Planes hard and very badly, turns hard and badly, polishes well. A valuable and handsome wood, which should be useful, especially for such purposes where great hardness is essential. Makes handsome walking sticks which are almost unbreakable, used for cogs and shafts, being considered too hard for other purposes.* For mechanical tests see tabels attached. Trees of

*For further detailed information in regard to Greenheart, see U.S. Dept. of Agriculture, Forest Service, Cir. 211, "Greenheart" by C. D. Mell and W. D. Brush, 1913; Greenheart, a timber with exceptional qualities" by A. K. Armstrong, Engineer in Forest Products, Wisconsn, U.S.A. reprinted from the Engineering Record, January 29th and February 5th, 1916; "Timbers of Commerce" by Herbert Stone, F.L.S., F.R.C.I., 1904; "Timber and Timber Trees" by T. Laslett; and pamphlets by Sprostons, Ltd., British Guiana.

small diameter that average 45 to 65 ft. in height. Plentiful in some localities, not readily procurable in others; logs squaring 12 to 14 inches. While in flower is one of the most beautiful of our forest trees, the bright yellow flowers appearing from a distance like a mass of gold. Two varieties with 3 and 5 leaves; of the latter there are at least 2 kinds (with and without serrated edges) one of which grows to about 12-14 inches diameter. WASHIBA or Bow Wood. This appears to be a variety of the 5-leaved Hackia. It has similar flowers and fruit but grows to a much larger size on flat clay lands.

24. HAIAWA. (Hiawa).

Protium Heptap- hyllum, March.

N.O. Burseraceae.

A yellowish light brown or rather pale red colour; darkens but little on exposure; surface glossy. Sapwood oatmeal colour, well but not sharply defined. Wt. 49¾ lbs., S.G. 0.51 to 0.84; grade 6, firm, compare beech. Smell when dry none, taste astringent. Planes fairly well and moderately easily; turns moderately hard but well; polishes indifferently. Suitable for interior work only as it is liable to decay, for drawers and wardrobe shelves. Fairly plentiful in some districts, in Canje 2.82. North West 0.04 per acre. Average height about 50 ft. squaring about 10 inches. Produces the gum known as Haiawa or Resin of Conima, burnt as incense. Known also as incense tree.

25. HAIAWA-BALLI. (Hiawa-balli).

Uniform colour, Mahogany to red brown; fine grain; darkens very much on exposure, becoming a richer colour, surface bright. Sapwood oatmeal colour, well but not sharply defined. Wt. 62½ to 66¼ lbs., S.G. 1.0 to 1.20 (mean 1.074); grade 4, hard, compare Yew; smell none, taste spicy (not strong). Planes and turns well though hard, polishes well. Of great beauty, makes handsome furniture and in great request for cabinet work. Scattered and scarce. Tree averages about 90ft. logs squaring 12-16 inches. It has sticky gum similar to Hubu-balli.

26. HAIARI-BALLI. (Hy(a)ri-balli).

Uniform nut brown colour; fairly coarse grain; darkens but little on exposure; surface (in radial section) lustrous. Sapwood very narrow, very sharply defined. Wt. 47¼ lbs., S.G. 0.75 grade 6, firm, compare Oak; smell or taste none.

Planes and turns badly though easily; A handsome wood. A good furniture wood. No. per acre 11.1, North West, 3.92, Essequebo, 10.62, Demerara, 2.2, Courantyne Rivers; Logs 30 to 40ft. squaring 8-9 inches. There are 2 varieties, brown and pale; the above description applies to the brown.

HOWADANNI KAKARALLI see under Kakaralli.

27. HUBU-BALLI.

A light brown or whitish-brown wood having dark brown or blackish irregular streaks here and there; moderately fine grain; surface brilliant and lustrous. Sapwood much lighter than heartwood, well defined, but without much contrast. Wt. 39-40½ lbs., S.G. 0.62 to 0.89; grade 7, soft, compare Pine; smell or taste none. Planes fairly fast and very well, turns hard and unusually well by hand, but very rough and badly by machine, takes an excellent polish. A wood of great beauty that deserves attention on account of its pretty figure and other good qualities (Stone.) Much used for furniture and cabinet making of all kinds and makes extremely handsome bed-posts. Lasts well under water, will out last almost any other wood at the bottom of a boat. Scattered; said to be readily procurable in Ituribisi River, Mazaruni-Cuyuni district and Demerara River. Logs up to 30 ft. squaring 14.20 ins. free of sap. The bark has a sticky gum. Must not be confused with Hubu or Hog plum, the wood of which is fairly soft and of a white or light yellow colour. Wt. 57½ lbs. S.G. 0.92; common all over the Colony. Fruit an edible golden yellow plum.

28. IRRIARIA-DAN. (A species of Trysil) *Cassia multifuga.* Rich. N.O. Leguminosae.

Light brown to dark brown, biscuit colour, with fine red lines; coarse, open grain; darkens but little on exposure; surface bright in radial section but dull in the others. Sapwood very

dark grey, sharply defined. Wt. 49¾ lbs., S.G. about 0.91 (mean); grade 4, hard, compare Hornbeam; smell none, taste little if any.

Planes and turns moderately hard and badly ; takes a fine polish. Suitable for cabinet work, partition boards, staves and many other purposes. Most durable, but little known. Readily procurable in logs up to 50 ft. squaring 10-12 inches. The leaf resembles that of Trysil ; the bark produces a sticky yellow gum.

29. ITE-BALLI. (Aeta-balli, Etaballi) *Vochysia tetraphylla*, D.G.

N.O. Vochysiaceae.

Uniform pinkish colour (golden brown) with pretty silver grain ; open grain ; darkens a little on exposure ; surface clean. Sapwood lighter (whiter or greyer), not defined. Wt. 47¾ lbs., S.G. 0.60 to 0.76; grade 7, soft compare Pine; smell when dry, or taste none. Planes, turns and polishes badly (Stone) ; works easily and takes a good polish (Park and Cunningham). Makes fair furniture; said to last well in salt water; little used and not well known. No. per acre, 0.8 Essequebo, 7.9 Demerara, 0.27 Canje Rivers ; plentiful in upper Courantyne River. Logs up to 60 feet squaring 14-18 inches free of sap.

Must not be confused with Eda-balli or Wild Calabash which is a reddish brown wood of uniform colour, close grain, bright surface inclined to appear frosted, 47 lbs. Weight and S.G. 0.75; grade 6 firm, works easily and well, polishes indifferently; has the advantage of not splitting, has been used for gun-stocks. Not plentiful and a small tree.

30. ITIKI-BOURA-BALLI. *Machaerium Schomburgkii*, Benth. also *Byrsonima brachystachya*, Poepp.

A rich, nut-brown uniform colour (deep brown, almost black) ; close grain; darkens but little on exposure ; surface brilliant, lustrous in radial section, sapwood dirty yellow or oat-meal colour, sharply defined. Wt. 50½ lbs., (too low, chiefly sapwood), S.G. 0.86 to 1.32; grade 4, hard, compare Hornbeam; smell none, taste slightly resinous.

Planes well though hard, turns well, polishes indifferently. A handsome wood resembling walnut. Used for cabinet work, inlaying, panelling, walking sticks and rulers. Comparatively rare below the rapids. Average height 70 ft. squaring 15 inches. Its purple flowers have the odour of violets.

Not to be confused with Itiki-boura or Corkwood (*Pterocarpus draco*, Linn.). The heart of this tree is brown and the sap lighter coloured; the spurs or root-butteresses are composed of a light, dirty-white, soft wood. The bark yields a thin red gum.

31. KABUKALLI. (Cabacalli). *Goupia glabra*, Aubl.

N.O. Celastrineae.

Brown or reddish-brown ; tough and close grain ; darkens but little on exposure; surface dull. Sapwood greyish to yellowish—white. Wt. 52¾ to 56½ lbs., S.G. 0.84 to 0.94; grade 3, very hard, compare Blackthorn. Smell abominable (but this apparently disappears with age and curing), taste very offensive.

Planes well, (turns hard and badly, polishes badly) ; works easily, takes a fine polish. Makes very durable furniture ; used for railway sleepers, paving blocks, boat building, it must, however, be fastened with copper nails. The Indians prefer canoes made of this wood to any other as they will not split from exposure to the sun. Little inferior to Mora for timber. It is disliked by worms. For mechanical tests see table I attached. Readily procurable (plentiful all over the Colony) ; logs up to 60 ft. squaring 12-16 inches ; may be met with 120 ft. long by 30 inches square free from sap. After cutting a gelatinous substance forms on the stump, it has a disagreeable smell and never hardens.

32. KAKERALLI. Several kinds. *Lecythis spp.*

N.O. Lecythidaceae.

HOWADANNI KAKARALLI. *Lecythis sp.*

Uniform yellow brown colour ; very dense, fine grain ; darkens somewhat on exposure ; surface clear, cold to the touch. Sapwood very dark brown, much darker than the heart, sharply defined. Wt. 59 lbs., S.G. 0.94 ; grade 4, hard, compare Yew. Smell none, taste astringent.

Planes and turns hard and badly ; polishes badly. Used in house-building. Not plentiful.

KAKARALLI. *Lecythis ollaria*, Linn. and other sp.

Reddish or greyish brown colour; fine grained and dense. darkens little if at all on exposure ; surface glossy. Sapwood light brown, well but not sharply defined. Wt. 53¼ to 62 lbs., S.G. 0.85 to 0.99, grade 2, extremely hard, compare Boxwood. Smell peculiar when worked ; taste none.

Planes hard but well and offers more resistance to the tool in some places than in others, turns well and polishes extremely well. Used for house-framing, wharves, piles, sluices ; said to resist Teredo and Barnacles ; more durable than greenheart. Berkhout says that recent researches in Holland point to the fact that this wood does not resist Teredo ; he does not, however, accept these results as conclusive. Cleaves straight, exceedingly strong and hard to break transversely. One of the strongest woods that I have ever seen. 'Fractures like cane, with a very long, fibrous, stringy, almost "green-stick" fracture, (Stone). Common throughout the Colony, in places abundant. These trees grow tall and straight, but are too heavy to make spars. For mechanical tests see table II. attached. There are 2 kinds of Kakaralli, black and white ; the inner bark of the latter and also of the Wadara and Wiri-miri Kakaralli is used by Indians as a substitute for, and in preference to, paper for cigarette wrappers, these are called "Wina." Stone says the bast is satiny and laminated and can be separated into as many as 70 layers. The bark may be used for tanning. Logs up to 50 ft. squaring 10 to 14 inches.

WADARA KAKARALLI. *Couratari guianensis*, Aubl. For mechanical tests see table II attached. No. per acre of all kinds of Kakaralli, as follows:—30.5 North West, 5.21 Essequebo, 22.82 Demerara, 7.52 Berbice, 4.6 Courantyne Rivers. Wiri-miri Kakaralli found on flat clay land.

LAUTA. N.O. Rosaceae. *Moquilea pallida*, Hook. f. (Kew 1918.)

33. KAUTA-BALLI. *Licania mollis*, Benth.

N.O. Rosaceae.

Dark brown colour, inclined to be stripy ; close, straight grain ; darkens a little on exposure. Possibly a sapwood tree. Wt. 76¾ lbs., S.G. 1.09 to 1.23; grade 2, extremely hard, compare Boxwood; smell unpleasant when sawn, taste none. Planes and turns hard and badly, polishes indifferently (specimen was shattered . . ., good samples will be found to have great resistance to transverse strain (Stone). Very durable if not exposed to weather ; not much used ; useful for house-framing. Logs 30-40 ft. by 10-14 inches. Plentiful on hilly land. No. per acre 9.4 North West, 32.24 Essequebo, 16.0 Demerara, 7.41 Berbice. Fruit not edible. The bark made into charcoal and ground to powder is used by Indians to mix with the clay for making pottery. There are 2 or 3 varieties distinguished by size of their leaves.

34. KURAHARA.

Reddish brown colour ; close grained ; darkens a little on exposure ; surface lustrous. Sapwood same colour but lighter, not well defined. Wt. 50¾ lbs., S.G. 0.70 to 0.81, grade 6, firm compare Beech; smell or taste none. Turns modrrately easily but badly; easily worked, takes a good polish. A wood of good appearance. Makes good furniture ; used for making canoes and spars, for planking boats etc. Not plentiful. Logs up to 50 ft. squaring up to 20 inches. Has a resinous gum not known to be used for any purpose. Must not be confused with Karahora (Carahura.)

35. LETTER WOOD. (Burokoro, Snake-wood, Paira). *Brosimum Aubletii*, Poepp. & Endl.

N.O. Urticaceae (Kew, 1918).

Dark brown or chocolate colour marked in a striking manner with small patches of rich nut-brown to black, bearing a resemblance to letters or to the markings on a snake skin ; fine grain ; darkens considerably on exposure ; surface lustrous, cold to the touch. Sapwood extremely dense and hard, recalling West Indian Boxwood except that the colour is darker—brownish—yellow. Wt. 77-83 lbs., S.G. 1.23 to 1.33; grade 1,

excessively hard, compare Lignum-vitae or Ebony ; smell none, taste, faint, insipid. Planes hard and is very variable; turns hard and badly when light-coloured and stripy; polishes well, superbly. The sapwood planes very hard indeed but smoothly with a glossy surface, except where knots appear, and polishes well. Very little use, if any, is made of the Sapwood, but it deserves attention, and could be used for same purposes as West Indian Boxwood. The heartwood is very brittle ; it is used for making walking sticks, inlaying, letter weights, rulers, paper knives, small ornamental turnery, Tunbridge Ware etc., and by the Indians for bows. An extremely beautiful wood, well known in the English market. The tree is about 60-70 feet high by 24-36 inches diameter. It is scarce near the sea coast but is still plentiful on the upper Essequebo. The proportion of heartwood is small, seldom above 7 inches diameter even in the largest trees. In 1878 the heartwood was selling at 8d. per pound in the Colony.

36. LOCUST. (Simiri or Courbaril). *Hymenaea Courbaril*, Linn.

N.O. Leguminosae.

Dark brown to orange-red colour, often streaky; apparently fine and close-grained on account of the scarcity of the pores ; darkens on exposure ; surface dull. Sapwood yellow or dirty-white, fairly well defined. Wt. 33¾ to 57½ lbs., S.G. 0.53 to 0.94 (mean 0.79) ; grade 3, very hard, compare Blackthorn. Smell none, taste faintly sweetish.

Planes and turns moderately hard but well, polishes well. A wood of good appearance, never attacked by worms or dry rot. Used for furniture, mill-beds, trenails, shop counters, planking of vessels ; one of the best woods for building railway carriages; worth a trial for paving blocks. Found all over the Colony, scattered. Logs 40-50 ft. by 12-26 inches. For mechanical tests see tables attached. The Indians make "wood-skin" canoes from the bark which is thick and hard. The tree yields a gum resembling Anime or Copal, used in making varnish. Locust gum is found in large quantities (many

barrels) where a tree has decayed. It forms in the inner part of hollow trees and may also be obtained in small quantities by tapping.

There are 2 varieties of Locust, viz:—Simiri and Kawanari distinguished by the size of their bean-pods ; the pulp surrounding the beans of both varieties is edible.

37. MANNI-BALLI.

Uniform greenish brown-colour close grained ; darkens somewhat on exposure ; lustrous in radial section. Sapwood dark grey, sharply defined. Wt. 89½ lbs., S.G. 0.96 to 1.43; grade 7, soft, compare Pine (?) Smell or taste none. Planes easily and well; turns moderately easily but badly; polishes indifferently (works up beautifully, takes a fine polish, Park and Cunningham). Most durable when free of sap; makes good framing timber. Not plentiful. Logs up to 45 ft. by 12-14 inches. Produces a sticky yellow gum, not used for any purpose. Grows in dry situations. Said to be more durable than Manni (*Moronobea coccinea* Aubl.) which grows in swamp lands, produces a bright yellow sap which is used by Indians for making Karimani or Buck-wax. Manni is fairly plentiful: No. per acre 4.7 North West, 7.16 Essequibo, 11.58 Demerara. It is a hard wood, not very durable, and was used for staves.

38. MARISI-BALLI or Accouri bruit. (Marciballi), *Licania sp.* ? N.O. Rosaceae. Uniform nut-brown colour; fine grain; darkens but little on exposure; surface clean. A sapwood tree? Wt. 61½ lbs. S.G. 0.98; grade 3, very hard compare Blackthorn; smell none, taste little if any. Planes and turns very badly, though moderately easily, polishes indifferently (Stone). Easily worked, takes a good polish and very suitable for furniture. Used for house building; should make excellent scantlings; durable, and insects do not attack it. Plentiful in some districts. No. per acre, 3.92 Essequebo 4.7 Courantyne. Logs up to 40 ft. by 9 to 12 inches.

39. MORA. *Dimorphandra Mora,* Bth., Syn. *Mora excelsa.*

N.O. Leguminosae.

Dark brown or reddish brown colour, streaked with white or brown lines, coarse grain; darkens but little on exposure; surface lustrous. Sapwood yellowish or light brown, sharply defined. Wt. 57 to 68½ lbs., S.G. 0.91 to 1.10; grade 1 to 3, extremely to very hard, compare Blackthorn to Ebony. Smell none, taste bitterly astringent, but this is not apparent until the shavings have remained in the mouth for some time. Solution the colour of brown brandy. Planes well and smoothly when of good quality; turns badly; polishes well. It is a handsome wood but its appearance is sometimes marred by white secretion. It is worthy of more attention in Europe (Stone). " Rate one of the 8 first class woods at Lloyds'. Does not splinter, resists dry rot but not the Teredo. Very durable, more so than Teak. Used in shipbuilding recommended for the larger parts of ships; also piles; one of the best woods for railway sleepers and paving blocks, but these must be of mature wood well cured before use; makes good durable furniture. From branches and other parts of the tree "natural crooks" are obtained for forming the ribs and other parts of vessels and boats. Has long been known to shipbuilders and was used in the English Government Dockyards at one time. The huge and extensive root-buttresses, which support the tree, often when the lower portion of the trunk has decayed, thus forming a natural archway, is an outstanding feature of the Mora. For mechanical tests see tables attached. Grows in swamps, or flat lands bordering streams. Abundant all over the Colony; No. per acre 31.9 North West, 43.6 Essequebo, 26.14 Demerara, 25.28 Berbice, 36.4 Courantyne. Often of great height; logs can be had to square 24 inches free of sap or holes. The bark is used for tanning and medicinally in cases of dysentery. The fruit is grated and mixed with cassava by the Indians and used for food. A good cattle-food. Must not be confused with Mora-balli, Sand Mora or Moro-balli or Morabukea which are all inferior to Mora.

PARAKUSAN, see under Yaruru.

40. PURPLE HEART or Koruburelli. *Copaifera publiflora*, Benth.

N.O. Leguminosae.

Colour brown or pinkish-brown when freshly worked turning gradually to a deep purple (or magenta purple). Heating the wood brings out the purple colour The change of colour is evidently due to oxidation; it is quite superficial (Stone). The purple colour is destroyed by the application of spirit varnish or oil, the colour being then brown. Grain fairly coarse and open; surface cold to the touch. Sapwood dirty white colour, well defined. Wt. 49 to 62 lbs., S.G. 0.78 to 0.99 (mean 0.863); grade 2, extremely hard, compare Boxwood. Smell or taste none. Solution dark brown; the residue after evaporation purple.

Works well with all tools, although hard. Makes handsome furniture, unrivalled for inlaying work, ramrods, buhlwork, marquetry, turnery; a fine wood for house-framing, mill and mortar beds and all purposes where shock has to be resisted. Durable, capable of resisting great strains, strong and elastic. Not common, but fairly plentiful in some places. Grows in elevated sandy soil. Logs can be had to square 30 inches free of sap.

The bark is stripped from the trees and made into canoes ("wood skins") by the Indians.

McTurk states there are 2 kinds of Purple Heart, Koruburelli and Marawinaru and names another tree "Saka," purple heart. Saka is abundant in Canie River. Another variety found in Courantyne River is named Saka-balli.

41. SAREBEBE or Water Wallaba. *Macrolobium hymenoides*, Willd.

N.O. Leguminosae.

Uniform light red colour, would pass for a Mahogany; coarse grain; darkens but little on exposure; surface bright to lustrous. Sapwood dirty pinkish grey, sharply defined. Wt. 46 lbs., S.G. 0.73; grade 7, soft, compare Pine. Smell or taste none.

Planes easily but badly; turns moderately hard but indifferently ; polishes but moderately well. A wood of good appearance. Said to be good for furniture ; never used. Plentiful; No. per acre, 3.2 North West, 9.14 Essequebo, 7.30 Demerara, 3.57 Canje River. Logs 16 to 20 ft. by 8 to 12 inches square. Not a true wallaba.

42. SAWARRI. (Souari, Pekea or Butter nut tree). *Caryocar tomantosum*, Willd.

Uniform, hoary, greyish brown, or light brown ; tough and cross-grained; darkens but little on exposure; surface bright becoming dull. Sapwood dirty white, sharply defined. Wt. 59-62½ lbs., S.G. 0.94 to 1.0; grade 4, hard, compare Yew. Smell or taste little if any. Solution in water almost colourless.

Planes very badly though moderately easily; turns moderately easily but indifferently, takes a good polish. From its evident durability and toughness it might be valuable for piles. The wood is little used but (McTurk states) the roots make excellent floors and futtocks for shipbuilding and can be had sufficiently large to timber a vessel of large size. Excellent for shipbuilding, mill timbers and planks. For mechanical tests see table I attached. Scattered, fairly plentiful in some districts. Logs can be obtained up to 70 ft. long by 24 inches square. The Sawarri-nut (Butternut) is one of the best nuts in the world but is little known outside the Colony.

43. SEREBA-DANNI. (Siribidanni).

Purplish colour; fine grain; darkens little, if at all, on exposure; Sapwood yellowish, suggesting Boxwood, sharply defined. The sapwood is said to decay rapidly in weather. Wt ?, S.G. 1.08; grade 3, very hard, compare Blackthorn. In appearance resembles Bania and Wamara. Planes fairly well, turns moderately hard but well, polishes indifferently. The heart is useful for inlaying and making furniture. Procurable only in small sizes. Rather scattered and scarce.

44. SIBA-DANNI. (Seebadanni). *Aspidoseperana sp.* (Kew 1918.)

N.O. Apocynaceae (Kew, 1918).

Yellow to brown colour, banded light and dark; close grain; darkens a little on exposure; surface lustrous, frosted. Sapwood oatmeal colour, well defined. Wt. 52¼ lbs., S.G. 0.84 to 1.07; grade 4, hard, compare Yew. Smell none, taste rather astringent.

Planes easily and well, turns moderately easily but badly, polishes well. Makes durable furniture, used for house-framing. Very like greenheart, used in the same way and often sold as greenheart (Bell.) Readily procurable in logs 40-50 ft. squaring 10-14 inches.

45. SIBBI-DANNI.

Uniform brownish-yellow colour, resembling Boxwood; close grain; darkens but little on exposure; surface bright. Sapwood rather lighter in colour. Scarcely defined. Wt. 61½ lbs., S.G. 0.98 to 1.07; grade 3, very hard, compare Blackthorn. Smell or taste none.

Planes hard but well, turns hard and badly, polishes indifferently; brittle (Stone). Easily worked and takes a fine polish (McTurk and Park and Cunningham). Very durable; makes good furniture although a little heavy for this purpose; used in house-framing. Grows plentifully on high land. Short trees, not over 30 ft. and logs squaring not over 9 inches.

46. SILVER-BALLI (Shirua-balli. *Ocotea* or *Nectan- spp.*

N.O. Lauraceae. Several kinds.

Brown Silver-balli *Ocotea sp.* or *Nectandra sp.* (Kew. 1918.)

Cedar brown to dark brown with black patches here and there; moderately coarse grain; darkens a little on exposure; surface lustrous. Sapwood light brown. Wt. 44½ to 56¾ lbs., S.G., 0.72 to 0.91 (mean 0.8); grade 3, very hard, compare Blackthorn. Smell something like sandal wood when sawn, taste slightly astringent.. Solution in boiling rain-water colourless, afterwards with alcohol, pale brown.

Planes moderately easily, turns well, polishes well. Makes durable furniture but used chiefly for boat building for which it is specially adapted. For mechanical tests see tables attached. Not plentiful; the trees attain a large size; logs 50-60 ft. by 18-20 inches.

KEFITI SILVER-BALLI. (Kretty). *Nectandra Pichurim*. Mez. *Octoea sp.* near *O. jasiculata*, Mez. (Kew 1918.)

Brown or whitey-brown colour ; moderately coarse grain; darkens considerably on exposure; surface lustrous, not cold to the touch. Sapwood greyish-white gradually merging into the darker heartwood. Wt. 25 to 32 lbs., S.G. 0.45 (mean), grade 5, rather hard, compare Ash. Smell and taste resembling those of cigar box Cedar. Planes and turns easily and well, polishes readily to a medium finish. Useful for inside boarding and upper planking of boats. Plentiful in some localities, logs up to 40 ft. squaring up to 15 inches. It has a strong resemblance to Havana or Cigar-box Cedar in aroma, grain, texture and ease of working, but is very much paler in colour.

Maniap Silver-balli (yellow or white) *Nectandra globosa*, Mez. (Kew 1918.)

SAWARRI-SKIN SILVER-BALLI.

Wt. 34 lbs., S.G. 0.54.

White or Bouragie Silver-balli. *Ocotea acutangula*, Mez. *Nectandra Pichurim*, Mez. (Kew 1918).

Uniform greenish or yellowish colour; coarse grain; darkens but little on exposure ; surface lustrous, brillant and satiny. Probably a sapwood tree. Wt. 26¼ lbs., S.G. 0.42 to 0.56 grade 7, soft, compare Pine. Smell and taste none.

Planes and turns easily but badly, polishes well. Its appearance is good as its lustre is so rich, but its durability is doubtful. Suitable for inside boarding. Logs up to 30 ft. by 8 to 9 inches. For mechanical tests see table II attached.

YEKURU SILVER-BALLI. (YAKOORA).

Light brown colour with markings resembling Maple; grade firm. S.G. about 0.66.

Works easily and takes a fine polish. Of same use as the other silverballies.

YELLOW SILVER-BALLI. *Nectandra Pisi*, Mip.

Bright golden yellow colour to light brown; fine, even grain ; darkens but little on exposure ; surface bright, almost lustrous. Sapwood dirty white colour, well defined. Wt. 37-52 lbs., S.G. 0.59 to 0.83; grade 3, very hard, compare Blackthorn (?). Smell when worked like that of certain kinds of cedar ; taste spicy, like that of cigar box Cedar.

Planes and turns easily and polishes well. When free of sap is most durable. Chiefly used for upper planking of boats ; makes very fine furniture. Small sizes giving 8-10 inch, boards readily procurable ; larger sizes are scarce and frequently defective. The bark is useful for tanning. For mechanical tests see table II attached. There is another yellow kind recorded known as Mainap and Silver balli. No. per acre of all the different kinds, 1.2 North West, 3.04 Essequebo, 0.4 Demerara, 0.4 Berbice, 0.4 Canje River, which show that these trees are scattered and scarce. Three kinds collected by the Forestry officer identified Kew 1918 as follows :—

(1) A large tree *Persea nivea.* Mez. (2) tree with small fruit, *Aniba sp.* ; (3) tree with large fruit *Aniba Jenmani*, Mez.

47. SIMARUPA. *Simaruba amara*, Aubl. or *S. officinalis*, Macfad.

N.O. Simarubaceae.

Milk-white colour ; moderately coarse and open grain ; darkens little, if at all, on exposure ; surface lustrous. A sap wood tree. Wt. 27-30 lbs., S.G. 0.41 to 0.48 ; grade 8, very soft, compare White Pine. Smell when dry none, when fresh bad ; taste very bitter but not intensely so as in Quassia, and not in specimens that have been dried for a long time.

Very easy to plane and turn, polishes indifferently. Not attacked by wood ants and will not stand exposure to weather (McTurk). Uses : partitions and other indoor house work and locally for making matches. Grows to large size on sandy soil but rather scattered. The bark of the root is used medicinally in cases of diarrhoea.

48. SURADANNI. (Seridani) *Hieronyma laxiflora*, Mull., Arg. (Kew 1918).

N.O. Euphorbiaceae. (Kew 1918).

Reddish brown to nut brown (Mahogany-like) colour; rather coarse grain; surface dull. Sapwood brown, well, but not sharply, defined. Wt. 45-47 lbs., S.G. 0.75 (mean): grade 6, firm, compare Oak. Smell or taste none.

Planes and turns moderately hard but badly, polishes indifferently (Stone); works well, takes a fine polish (Park and Cunningham). Makes good furniture, used for making canoes, planking boats and many other purposes; should do for sleepers. Grows to large size. Logs readily procurable up to 35 ft. squaring 12 to 14 inches.

TAURONIRO. (Tawaronero or Bastard Bullet, (Balata Tree).

N.O. Humiriaceae. *Humiria floribunda*, Mart.

Dark reddish-brown colour; fine grain; darkens somewhat on exposure; surface lustrous, smooth and cold to the touch. Sapwood brownish-white, well defined. Wt. 48¼ to 74½ lbs., S.G. 0.98 (mean).; grade 2, extremely hard, compare Boxwood. Smell or taste none.

Planes and turns moderately hard and well, polishes well. A generally useful wood where strength and hardness are required. Makes durable furniture, wheel-spokes, house-frames, saws into good boards and planks. Where small sized timber is required is superior to greenheart. Readily procurable in logs up to 40 ft. squaring 12 to 14 inches. Produces a gum in small quantities. At the expiration of a week or 10 days after cutting away the bark from the stem of these trees a minute fungus emitting an agreeable perfume grows upon them; this is scraped off and used by the Indians for scenting their hair oil. Fruit edible, about the size of a grape.

50. TIBIKUSHI or Bastard Letterwood. (Tibicusi). *Brosimum Aubletii*, Poepp. et Endl. var: (Kew 1918).

N.O. Urticaceae. (Kew 1918.)

Rich reddish-brown to nut-brown colour, streaked with black lines, beautifully marked ; close grain ; darkens considerably on exposure ; surface rather dull, hardly cold to the touch. Sapwood reddish white, well defined. Wt. 63-67 lbs., S.G. 1.04 ; grade 2, extremely hard, compare Boxwood ; smell none, taste astringent. Sapwood, when dry, will float in water and it decays rapidly on exposure to weather. Planes hard and but moderately well, burns hard and well, polishes well. There is evidently but little heartwood in each tree. Used for inlaying cabinet work, bows and walking sticks ; should find a market amongst the turners and makers of small wooden wares. A rare wood.

51. TONKA BEAN or Kumara. (Tonquin bean). *Dipteryx odorata,* Willd.

N.O. Leguminosae.

Nut-brown colour veined with pale brown or yellow ; close grain ; darkens but little on exposure ; surface bright. Sapwood pale brown, greyish brown, clearly defined. Wt. 64½ to 67½ lbs, S.G. 1.0 to 1.08 ; grade 2, extremely hard, compare Boxwood. Smell or taste none. Planes very badly ; turns hard and badly, very cross grained and troublesome. Exceedingly tough and durable ; useful for mill-beds, naves, cogs, shafts and any other purpose where a strong wood capable of resisting great pressure is desired ; takes a fine polish but not much used for furniture. Should make good paving blocks. Fairly plentiful in some localities. Average height about 90 ft. and will square about 22 inches. Bears the Tonka beans, well known in the Colony ; used by Indians to perfume hair oil; put among clothing, supposed to keep away moths and other insects ; an oil can be extracted from them.

52. TRYSIL or Koro-balli. *Pentaclethra filamentosa,* Benth.

N.O. Leguminosae.

Dark-brown or red brown colour with black veining; close grain ; darkens a little on exposure ; surface clean to bright.

like articles. Used for **turnery, furniture, house-building,** formerly for hogshead staves. Plentiful In some districts ; No. per acre : 10.79 Demerara. Logs up to 40 ft. squaring 12 inches. Bears a large, cup shaped pod, with a circular cap which is detached in falling from the tree. The nuts, in the pods are edible and a fine oil can be extracted from them.

There are 2 varieties distinguished chiefly by size of their leaves. The small leaved kind grows to a large size on sand and clayey soil; the broad leaved variety is a much smaller tree and its wood is not so durable as the former ; grows in swampy places.

55. WAIKEY. (Whykee). Several kinds *Inga spp.*
N.O. Leguminosae.

KAROTO WAIKEY. No information

PAIROWA WAIKEY. *Inga ingoides,* Willd.

Light brown colour, coarse grain, soft, light wood. Not durable.

SHIRADA WAIKEY.

Light, yellowish-brown colour, coarse grain, soft, light wood. Not durable.

WATER WAIKEY ; stragglers, etc.,

Some of these are large trees. The majority if not all of them, are light covered, soft woods which may be useful for manufacturing paper pulp. They are fairly abundant ; No. per acre = 1.7 North West, 2 to 6.55 Essequebo, 21.81 Demerara, 1.05 Canje.

The fruit of some of the above trees edible.

56. WALLABA, SOFT *Eperua falcata,* Aubl.
N.O. Leguminosae.

Deep red to purplish-red colour (like dried blood) ; coarse grain ; darkens somewhat on exposure ; surface dull, very sticky ; the wood bleeds a crimson gum freely. Sapwood dirty white, sharply defined. Wt. 62 to 67 lbs., S.G. 0.98 to 1.08 grade 3, very hard, compare Blackthorn. Smell and taste like creosote. Splits very *easily, straight and fairly* cleanly; planes

Sapwood reddish-white to reddish-oatmeal, well defined. Wt. 49¾ to 50¼ lbs., S.G. 0.58 ; grade 5, rather hard, compare Ash. Smell none, taste astringent. Planes moderately hard and badly, polishes well. A handsome wood, makes good furniture; used for floor beams and framing and the smaller sizes for spars. On the coast lands large quantities cut for fuel. Plentiful; No. per acre, 11.7 (swamp) to 4.3 (high land) North West, 12.83 Essequebo, 16·48 Demerara. Logs up to 40 ft. squaring 10 inches. Smaller on swampy coast lands.

The bark is used by the Indians in cases of dysentery.

53. VOGEL KOP or Kudibutshi. (Fogel Kop.) *Sideroxylon sp.* (Kew 1918.)

N.O. Sajotaceae.

Light brown colour, close grain, darkens but little on exposure ; surface bright. A sapwood tree. Wt. 49½ lbs., S.G. 0.58 to 0.79 ; grade 6, firm, compare Oak. Smell or taste none.

Works moderately hard but well with all tools, polishes well, to a golden yellow colour. Used for indoor work of all kinds, oars and paddles. Logs readily procurable up to 35 feet squaring 8 to 10 inches.

Fruit edible, yellow in colour and about the size of an English cherry. Another tree of same name with large leaves collected by Forestry Officer determined as: N.O. Anonaceae —*Guatteria Schomburgkiana* Mart. (Kew 1918).

54. WADADURI or Monkey Pot. *Lecythis grandiflora*, Aubl.

N.O. Myrtaceae.

Uniform light-red or orange-red colour ; darkens somewhat on exposure ; dense, smooth and close grain ; surface lustrous. Sapwood lighter and whiter, clearly defined. Wt. 53¼ to 74 lbs., S.G. 0.85 to 1.18 ; grade 2, extremely hard, compare Boxwood. Smell or taste faint, if any. Planes badly and hard, turns hard but well, polishes almost naturally as it leaves the tool. Very strong ; transverse resistance great: it should find a market on this account for spokes and

moderately hard and well ; turns rather soft but well and smoothly by hand and indifferently by machine ; very troublesome to polish, as it smears, but better than one would expect from its stickiness. Very durable and stands exposure under all circumstances. Chiefly used for making shinbles for roofing (have been known to last 40 years), vat staves, paling posts, and stoves, house-frames, fuel. Makes good furniture but not much used for this purpose; would make good paving blocks ; Wallaba shingles are exported in millions annually to the neighbouring Islands. For mechanical tests see table I attached. Abundant in district Essequebo to Canje Rivers.

In a note on page 266 of the 1909 B.G. Handbook another kind of soft Wallaba is given viz :—*Eperua rubiginosa*. Aubl. There are 2 other well known kinds of Wallaba viz:—

BIMITI (= "Humming Bird") *Eperua Schomburgkii*, Bth.
TURI (=Baboon) *Eperua Jenmanii*, Oliver.

These are both used for purposes similar to the above, but they are neither as durable nor as abundant as the soft Wallaba.

Of all 3 kinds No. per acre = 6.1 North West, 8.83 Essequebo, 5.850 Demerara, 22.09 Berbice, 5.9 Courantyne.

7. WAMARA. (Womara). *Swartzia tomentosa*, D.C.
N.O. Leguminosae.

Deep purplish colour, almost black, resembles Ebony; close grain ; darkens but little on exposure ; surface bright. Sapwood oatmeal to yellow, very sharply defined, decays rapidly on exposure. Wt. 64½ to 67¼ lbs., S.G. 1.03 to 1.14 ; grade 2, extremely hard, compare Boxwood; smell none. Taste faintly astringent. Planes moderately hard and badly ; turns moderately hard but well; polishes extremely well. A valuable and beautiful wood which will find a ready sale for turnery. Uses, Tunbridge ware; inlaving and other cabinet work, but little used in the Colony owing to its extreme hardness. The Indians make their bows and clubs of this wood. The trees (being very strong transversely,) are used for slinging loads of other timbers in transit. Not plentiful ; Berbice 7.57 trees per acre. The

58. WARAKUKI, or White Cedar. *Tabebuia longipes*, Baker.

N.O. Bignoniaceae.

Uniform pinkish to light brown colour ; surface beautifully lustrous. A sapwood tree ? Wt. 58¾ lbs., S.G. 0·94 ; grade 7, soft, compare Pine. Smell or taste none.

Planes well and easily ; turns moderately hard and indifferently, takes a medium polish. Logs up to 40 ft. squaring 12 inches. McTurk states there are 2 kinds one darker than the other and further that when full grown the wood is dark brown. with a white sapwood, close grained, heavy and hard. Very durable, especially under ground, but splits on exposure to the sun. It is probably the best wood procurable in the Colony for foundation. Used for making paddles, oars, and the saplings for shovel handles. For mechanical tests see table attached. Grows in swamps, average height 60 ft. squaring 10 inches. The trunks of the larger trees ar somewhat fluted. Plentiful in places.

59. YARRI-YARRI, HILL, or Arara (or Lance wood).

N. O. Anonaceae. *Anaxagorea brevipes* (Kew 1918.)

Yellowish brown colour ; fine and dense grain ; light, medium hard. Tough, strong and elastic. Used for lances, shafts, spears, fishing rods, ram-rods, whip handles etc., the Indians make their arrow points from it. A slender tree fairly plentiful in some places ; seldom of considerable size ; from 4-6 inches diameter at the lower end and from 15-20 ft. long.

YARRI-YARRI, HILL, or Arora (or Lance Wood), black. N.O. Anonaceae. It is worthy of record that a new species was discivered at Issororo, North West District by the late Forestry Officer, Mr. C. W. Anderson. I.S.O., which has been named at Kew *Unonopsis Andersonii*, Sprague.

SWAMP YARRI-YARRI. (Lance wood). The tree is smaller than the above.

Both of the above are known as Black Yarri-yarri; there is another variety recorded called Red Yarri-yarri.

60. YARURU or Paddle wood. *Aspidosperma excelsum*, Benth.

N.O. Apocynaceae.

Yellowish brown colour ; open grain, medium light and hard wood. The wood is elastic, very strong and not apt to splinter. Was preferred to any other for cotton-gin rollers. Might be employed for floats of paddle-wheels of steamers. Used for making paddles, axe handles, etc. The trunk is deeply fluted, as if it consists of a bundle of boards standing on end, the edge of each forming a common centre. Trees 5-6 ft. diameter and about 50 ft. long. Scattered.

PARAKUSAN. (Lara-ku-sana or Bastard Yaruru).

N.O. Leguminosae. *Swartzia sp.*

This is also a paddle wood. Brown colour, medium hard, light, strong and elastic. Considered somewhat inferior to Yaruru. Similar fluted trunk; grows to large size, the fluted projections being sometimes as broad as 8 or 9 inches. Scatter ed, but more plentiful than Yaruru.

BOTANICAL NOTES.

SOME INTERESTING SPECIES OF PALMS.

Two species of Arenga. *A. saccharifera* and *A. Wightii* have already been noted, Vol. xi. No. 3, July 1918 ; there remains a third species which had been overlooked and one which deserves mention, being of a distinct character to the others. *Arenga Englerii*, a dwarf plant, practically stemless, forming a group 9-10 feet high and extending all round by means of suckers, creating a marked distinction in the point of the palms. The foliage with a 3 feet stalk, 8-9 feet long, regularly pinnate ; pinnate 2 inches apart, 2 feet long, 1¼ incehs wide, toothed on each side, notched at the points. The infloresence as in all Arengas commences at the apex. The spadices 12-18 inches long with simple stiff branches 7-9 inches long ; the fruit dark red, ½-⅝ inch in diameter, rounded, triangular, containing 1-3 small black seeds. I was fortunate on my visit to Demerara in March this year to see its first fruiting. There are but two plants of this species in the Botanic Gardens growing in the two first beds opposite the Band Stand on the South side of the Entrance Drive.

Veitchia Johannes, Pacific Islands. A tall growing palm of the Archontophaenix type but generally more handsome. Stem columnar, 10 inches in diameter, whitish. Foliage 9 feet long, gracefully arched pinnae 18 inches long, 2 or more inches wide, regular, almost touching. Inflorescence below the leaves. Spadix compound 2-2½ feet long with a similar spread, white. Flowers small, white. Fruit when ripe a deep crimson, conical with a blunt point as if it had been tightly tied, 2 inches long, 1 inch wide at base. The seeds when stripped shew lineal straightish markings with a decided longitudinal band ¼ inch wide on one side. Two conspicuous strings hang from the basal pinnae and adhere for some time, these act as a sinus connecting the pinnae till the leaf unfolds.

Coperuicea cerifera. The "Carnauba Wax" palm of Brazil. A tall palm. Stem 6 inches in diameter, columnar, the lower part covered with the leaf-bases whilst the upper part

is naked,—a peculiarity of this palm.—Foliage fan-shaped, 6 feet across, quite flat, segments cut to about half the depth of the leaf. Leaf-stalk stout with short, thick spines. Inflorescence interfoliaceous. Spadices 9 feet long, compound with many fine branches, half the spadix drooping outside the leaves. Flowers very small, white. Fruit small, pear-shaped, green, $1\frac{1}{2}$ inches by $\frac{7}{8}$ inch. Seed spherical, pointed, $\frac{7}{8}$ inch x $\frac{5}{8}$ inch. The wax for which this palm is famed is obtained from the surface of the leaves; these being cut and dried yield the wax in small flakes.

Washingtonia filifera. Of South California, the "Weeping Palm. A tall, stout, fan-leaved palm; stem 20 inches in diameter, regularly corrugated with innumerable cracks and slits. Foliage 4 feet across, plicate, slightly crumpled, segments cut to ⅓ its depth, fine threads hanging from the points of the segments. Inflorescence interfoliar ; spadices 12 feet long, slender, pendant, branching into three about 3 feet from the stem, thence into groups 8 or 9 inches apart, like bunches of grapes, 8 inches long with several simple branches 2-3 inches long. Flowers tiny, white. Fruit black, like small currants.

Nephrosperma Van Houtteaneum, from the Seychelle Islands. A dwarf palm, with a stem 6 inches in diameter, collars of black spines 3-4 inches long between the rings. Foliage feather-planned, 7 feet long, (1 foot stalk,) gracefully arching, leaflets 3 feet long, $1\frac{3}{4}$ inches wide, with 3 longitudinal ribs, set regularly one inch apart. Spadices amongst the lower leaves, 7 feet long, (4 feet stalk,) simple branches at the end 3 feet long, flowers dark yellow. Fruit conical about an inch long. The leaf-stalks, base of spadix and the persistent spathe all covered with black spines mixed 1-3 inches long. There is but one adult plant of this in the Gardens.

Acanthorhiza aculeata, of Central America. A slender fan-leaved palm ; stem regular 5-6 inches in diameter, covered with sharp stout thorns 2-4 inches long. Foliage 4 feet wide, flat, segments cut down to one-third of the depth, some nearly to the centre ; stalk 3 feet long. Inflorescence interfoliar ; spadices compound, 2 feet long with short wiry branches.

Flowers small, white. Fruit white, succulent, ½-¾ inch diameter.

Hyophorbe, two species from the Mauritius group of Islands.—*H. Verschaffeltii*, a handsome palm till it gets tall; stem 14 inches in diameter, ventricose. Foliage pinnate 8-9 feet long,—7 or 8 leaves to the head,—fairly stiff, ends arching sharply, stalk only a few inches long, the clasping leaf-bases conspicuously glaucous; the leaflets set close together 4 on different planes, flexible, 2 feet long, 1½ inches wide. Inflorescence below the leaves; spadices compound, spreading 2 feet each way, branches 9 inches long, slender, drooping. Flowers tiny, yellow, monoecious on same spadix, in close groups. Fruit narrow, ¾ inch long, purplish black. In young plants the ribs are all of a decided yellow colouring.

H. Amaricaulis. This is a decided contrast to most palms in form, being squat, stiff, and gouty. Stem comparatively short, 18 inches in diameter, ventricose, tapering sharply top and bottom. Foliage 4-6 feet long with a few inches of stalk, stout and stiff, arching towards the end. Leaflets 12-15 inches long, 2 inches wide. Set touching each other, semi-erect. Not more than 6 leaves to the head. Spadices below the leaves; before opening they are like curved horns, when open they are compound, 3 feet 6 inches long, spreading quite as much. Flowers tiny, yellow, in alternate groups crowded on the branches which are slender and wiry. Fruit elliptical, 1 inch long and ½-⅝ inch diameter. The whole plant quite rigid.

Pinanga Kuhlii, from Java. A dwarf palm with several stems, these 1½ inches in diameter, closely ringed. Foliage pinnate, 4 feet long with short stalk, spreading 3 feet wide. Leaflets 3-4 inches broad, set 1-1½ inches apart. Inflorescence below the leaves; spadices small with several thick, simple branches 8 inches long of a deep pink colour. Flowers tiny, yellowish. Fruit small, elliptical, pea-like. The young foliage unfolding is of a reddish brown, otherwise pale green. This is a shade looking palm and when grown in the full sun burns badly.

Dypsis madagascariensis, as its name denotes is a native of Madagascar. Several tall stems 5-6 inches in diameter, each with a head of a few leaves. Foliage 7-8 feet long, (short stalk,) drooping; leaflets in groups 12-15 inches long, 1 inch wide, points recurved. Inflorescence below the leaves; spadices 4 feet long, pendant, compound with fine branches, spreading 2-2½ feet. Flowers tiny, greenish. Fruit elliptical ½ inch by ¼ inch.

Martinezia, 2 species, belonging to the West Indies, very dissimilar in form.

M. corallina, introduced by myself from Turners' Hall Wood, Barbados. Stem 7 inches diameter, covered with mixed black flattish prickles 1-3 inches long. Foliage pinnate, 9 feet long, (2 feet stalk,) midrib covered with sharp black thorns an inch long; leaflets regular 1-1½ inches apart, 15-18 inches long and 2 inches wide, ends notched. Inflorescence between the lower leaves. Spadix 2-3 feet long, (1 foot stalk,) crowded with simple wiry branches 3-6 inches long. Flowers small, white. Fruit bright red ½-¾ inch diameter. The seeds ¼ inch diameter, prettily carved, pale brown, providing material for pretty necklaces.

M. caryotaefolia, common in Trinidad. Stem 3-3½ inches diameter with bands of mixed, black prickles between the rings, ½-3 inches long. Foliage 6 feet long, (18 inches stalk,) midrib covered with short prickles; leaflets in groups of 6-8-10; groups 4 inches apart; leaflets an inch apart, 6-9 inches long, elongated fan-shaped, points broad, erose. Inflorescence interfoliar; spadix 2 feet long,—half stalk. Simple branches 2-6 inches long, crowded on outer half length. Flowers tiny, yellow, fruit scarlet, ¾ inch diameter. Seeds ½ inch diameter, black. The kernels are edible as also the succulent covering and are greedily searched for.

Stevensonia grandifolia, from the Seychelle Islands. This is one of the palms which may be said to combine the feather and fan-planned foliage. Stem 7 inches in diameter, rather rough. Leaves 5 feet long, 3 feet wide, plicate, outer edges cut into segments 9 inches deep; midrib reddish and a yellowish tinge over all. Inflorescence between the lower

leaves. The spadix unopened is of a narrow pointed spindle shape 3 feet long; when open the branches are compound, 3 feet long, spreading 2 feet, the secondary branches wiry, 9-10 inches long. Flowers small, moncecious, close together. Fruit conical ¾ inch long, scarlet. The young plants are very ornamental and useful for general decorations, giving quite a contrast in general form and colouring of foliage, the ribs having a distinct reddish tinge; the leaf-stalks and leaf-bases are armed with viscious black spines from 1 to 4 inches long which however, disappear in the large mature plants.

Verschaffeltia splendida, also from the Seychelles. This is one of the few palms which grow on stilts as it were, i.e. large strong adventitious roots 1¼ inches in diameter, spring from the stem all round for several feet up the stem. A tall growing palm with a head of 5 or 6 leaves. Stem 8 inches in diameter, tapering in its whole length, smooth. Foliage much the same as that of the *Stevensonia* in size, form, and colouring but splitting more in various places presumably by the force of the wind. The inflorescence is also similar, with compound spadices of like length, spread, and wiry secondary branches. Fruit ⅞ inch diameter, round, dark brown.

Calyptrogyne Swartzii. "Long Thatch" "Mountain Thatch Palm," of the West Indies. Stem 9 inches in diameter tapering. Foliage pinnate 6 feet long; pinnae 3 feet long, inches wide with 3 longitudinal ribs, short stalk. Inflorescence between the lowest leaves. Spadices 2 feet long, spreading 18 inches, composed of stout simple drooping branches 9 inches long. Flowers tiny, white; fruit very small.

Phytelephas Macrocorpa, the "Ivory-nut palm" of Panama and New Granada. This is a dioecious palm, and as is generally the case the plants of both sexes are exactly alike till the spadices are produced. They are practically stemless and make handsome plants some 10-12 feet high with similar spread of foliage. Leaves pinnate 12-15 feet long pinnae in regular pairs an inch apart, 2 feet long, 1½ inch wide, spreading flat, turning edgewise, dark green. The inflorescence occurs close to the ground; the male is like a huge catkin, 18 inches long, 2 inches wide

white; the female is a huge mass of imbricated sections, 12 inches in diameter, depressed, globular, each section 2 to 3 inches across, woody. Seeds large, roughly wedge shaped 2 inches by 1½ inches, hard. The kernel hard, irony-white, used as Vegetable Ivory.

Cyrtostachys Renda, the "Sealing-Wax" palm, so called on account of its brilliant red leaf stems, midribs, and base, the "Malawarin" of the Malay Archipelago. It forms a large compact group by extending all round by means of suckers. The pretty green of the foliage and dark mottled green of the bare stems, contrasting with the bright sealing-wax red of the other parts, make the plant one of the most beautiful objects of the palm world. Leaves semi-erect, 6-8 feet long,—3 feet of which is stalk;—leaflets 15 inches long, 1½ inches broad, set regularly a little more than an inch apart. Spadices below the leaves; stem 6-9 inches long on which are several simple branches 12-18 inches long, strong, pendant. The flowers, are very small, close together, monœcious same spadix. Fruit small, elliptical.

Attalea Spectabilis, from the Amazon River. One of the grandest of the feather-leaved palms, at its best condition when it has a bare stem of about 6 feet. As it grows taller it loses its grandest proportions, though still a splendid palm. Stem 2 feet 6 inches in diameter; leaves enormous, 25-30 feet or more long, turning edgewise; leaflets set close together forming two rows, narrow, 2-4 feet long. Spadices amongst the lower leaves, at first confined in a woody dark brown corrugated spathe, looking like enormous cigars, 3-4 ft. long and 68 inches in diameter, with a long point. The spathe opens below, remaining arched over the spadix like a small capsized boat; when the fruit is fully formed the spadix hangs down close to the stem from the weight of the fruit which is packed tightly in an enormous mass, 4 feet 6 inches in length and 2 feet in diameter, each fruit the size of a fowl's egg, brown. This palm, is monœcious in the same spadix; the female flowers, which are large, occupy the inner portion—and that the greater part—and the males the outer shorter portion. In many of the West Indian gardens, this palm is erroneously named "Cohune" palm.

Attalea Cohune. The "Cohune" palm of British Honduras. This is another very grand palm, very rare in the West Indies. Similar in general growth to its congener but larger in every part. The head is larger; the leaves are longer, more upright, curved only at the ends. Flowers 1¼ inches long, ¾ inch diameter. Fruit half as large again or twice as large as in the other species. It bears the "Cohune Nut" from which "Cohune oil" is made.

Manicaria Saccifera, "Troolie palm," "Bussu palm," "Timite," of Central America and Guiana. A moisture loving palm rarely found far away from swamps. Stem 15 inches in diameter, not tall growing. Leaves semi-erect, stout, 12 feet long, irregularly pinnate with wide and narrow segments pinnae, 2½-3 feet long. Inflorescence interfoliar. Spadices 3 feet or more long with many simple bunches. Flowers small, yellow; fruit hard, tubercled, 1½ inches in diameter, in close bunches. When the spadix first appears, instead of being covered with a hard woody spathe, it is enveloped in a strong closely woven fibrous, elastic spathe, which stretches as the spadix matures, and splits at the apex, adhering to the spadix till decayed by weather. Specimens of the fibrous spathe may occasionally be seen as a curiosity, rolled up from the base to form a pointed cap like a "fools-cap." To obtain this it must be taken before it splits at the apex, by cutting it round at the base, when by its elastic nature it will slip clean over the spadix uninjured.

Diplothemium candescens, from Brazil. Stem 9 inches in diameter. Leaves semi-erect, lower ones slightly drooping, 9-10 feet long, only one foot of which is stalk. Leaflets 18 inches long, 1½ inches wide, set regularly in two rows about an inch apart, standing out rigidly on both sides. Silvery beneath. Spadices among the lower leaves, moncecious, the female flowers occupy about 18 inches length crowded together, and the males about 12 inches length at the end, the stalk 6 inches long. The spathe is persistent; before the spathe opens it has the appearance of a curved brown horn 3 feet 6 inches long. The fruit 1⅛ to 1¼ inch in diameter, triangular or many sided by compression, flat at top, with a tense fibrous coat; when young

of a bright pale green, ripening yellow. Seeds dark brown, spherical.

Rhapis flabellifomis from China. The "Ground Rattan Cane." A dwarf palm 9-12 feet high, extending by suckers all round forming large close-stemmed groups. Stems not more than ¾ inch thick, closely ringed. Foliage fan-shaped, 16 inches across, 10-12 inches deep, the base almost at right angles, points notched. Segments cut to 1-1½ inches of the centre, 1-1¼ inches wide, with 3 longitudinal lines, dark green, edges of segments very finely serrate. Leaf stalks slender 10-12 inches long. Inflorescence between the lower leaves. Spadices compound, the largest spreading 8 inches each way; branches 4 inches long. Flowers very tiny, yellow; whole inflorescene often of a pale pink. Fruit small, brown. An elastic netted fibrous material occurs amongst the leaf stalks on the upper part of the stems.

J.F.W.

WEST COAST AGRICULTURAL ASSOCIATION.

Regular and special meetings of the West Coast Agricultural Association at Hague, were held during the first two quarters of the year. In February the Rev. J. F. Denny, President of the British Guiana Farmers' Conference, was with us. He rendered us valuable services. The attendance of members was large. The Rev. Denny delivered a very interesting talk on Agriculture.

Mr. Thos. Richardson presided over our March meeting when the Hon. Secretary, the Rev. W. A. Deane suggested that a "piggery" be started: The suggestion was adopted: Mr. Douglas moved that a plot of land from Hague be applied for. The motion was agreed to and the Hon. Secretary was authorised to communicate with the Commissioner of Lands and Mines.

The Annual Meeting of the B.G.F.'s Conference met at Bagotville in April and the Rev. W. A. Deane, Hony. Secretary was our delegate.

During the six months, on account of unusually heavy rains and other causes, house-lots as well as provision lands were greatly inundated. It is to be hoped that in time better drainage will prevent general flooding.

We wish our departed Farmers' Delegate the Rev. Eric R. O. Robertson to England and the others of the Colonisation Scheme every success and a safe return home.

PLANT DISEASES AND PESTS NOTES.

The following summary of a detailed investigation into the cause of Bud Rot in the Phillipine Islands and which is reproduced from The Phillipine Journal of Science is of interest.

1. Enormous losses, amounting to thousands of pesos each year, are produced by coconut bud rot. As shown by the Bureau of Agriculture reports, the disease is most prevalent in Laguna, Tayabas, Pangasinan, and Zamboanga Provinces. It is most abundant in the very humid sections and in thickly planted groves, both of which conditions are found on the slopes of Mount Banahao. Field studies show that the spread may be extremely rapid during favourable weather.

2. An organism similar to *Bacillus coli* (Escherich) Mig., and other saprphytic bacteria are associated with the disease. Under certain conditions, such as a host weakened by severe injury, the former organism and *Bacillus coli* (Escherich) Mig., isolated from man or horse, may in inoculation experiments produce disease.

3. A summary of the entire bacteriological work done by the present writer, including approximately three hundred inoculations has indicated that while the bacteria are always present and are a factor in destroying the weakened tissues, they cannot account for the initiation of the disease or its prevalence and rapid spread.

4. *Phytophthora faberi* Maubl. isolated from cacao produces a typical bud rot of coconut seedlings and of mature coconut trees.

5. A fungus isolated from a typical field case of coconut bud was found to be identical with *Phytophthora faberi* Maubl. isolated from cacao.

6. *Phytophthora faberi* Maubl. isolated from the field case of coconut bud rot produced in all inoculated seedlings a typical infection.

Phytophthora faberi Maubl. isolated from the field case of coconut bud rot produced disease in coconut seedlings, cacao fruit, *Hevea* rubber seedlings, and Papaya fruit. The same species of fungus isolated from cacao fruit produced disease in coconut seedlings and mature trees, cacao fruit and stem, *Hevea* rubber seedlings and mature trees, and Papaya fruit.

8. A morphologic and taxonomic study of the organism isolated from coconut has proved that it is *Phytophthora faberi* Maubl., as described by Rosenbaum. (10).

9. From these researches it can be stated with certainty that *Phytophthora faberi* Maubl. causes coconut bud rot; bacteria are apparently, in the majority of cases, always secondary, but are concerned with destroying the weakened tissues.

10. By proving that the fungus causing coconut bud rot is identical with the organism which produces black rot of cacao pods, canker of cacao, fruit rot and canker of *Hevea* rubber, and rot of papaya fruit, it becomes evident an entirely new series of controls will have to be devised. *Phytophthora faberi* Maubl. may grow readily, under favourable conditions, as a saprophyte also, on dead portions of coconut, cacao, and papaya.

RECOMMENDATIONS.

1. Trees when once severely infected never recover. The mode of growth of the palms and the nature of the disease make it impossible to cure trees already badly affected.

2. Systematic inspection, condemning and burning all diseased coconut trees, as carried on by the Bureau of Agriculture should be continued.

3. All parts of diseased trees must be burned; otherwise the organism will live as a saprophyte on dead matter, and then spread to healthy trees.

4. Clean cultivation ought to be practised in all groves.

5. Under no circumstances should coconuts be interplanted with cacao or papayas.

6. If coconuts are planted near diseased *Hevea* rubber, precautions should be taken to avoid the spread of the disease.

7. Trees in new groves must be planted 10 meters apart each way. This spacing is one of the most satisfactory means of control against bud rot, and at the same time tends to give the highest production of nuts.

NOTES ON A COLLECTION OF PRESERVED DRY FRUITS AND SEEDS. (Continued.)

BY J. F. WABY.

"Porcupine bean," *Centrolobium Paraense*, West Indian. A very peculiar bean, 7 inches long in full; the base with the seed globular, 2 inches in diameter, covered with innumerable sharp spines $\frac{1}{4}$-$\frac{1}{2}$ inch long; a brown wing above this 5 inches long, $2\frac{1}{2}$ inches wide, of thick papery substance with striations from base to outside, a large thorn at the base an inch long. A tall forest tree; foliage pinnate with $6\frac{1}{2}$ pairs of leaflets, oblong 7-8 inches long, $3\frac{1}{2}$ inches wide, the terminal leaflet larger than the others and more rounded. Inflorescence a large terminal panicle. The fruit is indehiscent. Specimens from Trinidad.

"Tonka or Tonquin bean," "Cumara," "Gaiac." *Dipteryx odorata*, indigenous. The bean 2 inches long, a little over an inch wide, a little under an inch thick, oblong, greenish, covered with a thick skin, indehiscent, one-seeded in a hard shell covered with short matted fibre. Seed black, rounded, wrinkled, $1\frac{1}{2}$ inches long, $\frac{3}{8}$-$\frac{1}{2}$ inch wide, perfumed. A tall little spreading tree; the inflorescence terminal and axillary in short racemes; foliage pinnate with 3 pairs of leaflets. The seeds are much sought after by perfumers and private persons use them largely in wardrobes as an agreeable perfume amongst their clothes. Specimens from North West District.

"Aramatta," *Diplotropis bradizpetala*, indigenous. Fruit rhomboid 6½ inches long, 3 inches wide with a short beak, one or two seeded, seeds bulging, dehiscent. Seeds 2 inches by 1½ inches, ⅜ inches thick, with 3 dark curved lines on surface. Inflorescence in terminal and axillary panicles ; flowers small. Foliage pinnate in 2½-3½ pairs of leaflets, entire, oblong, pointed 6-7 inches long, 3 inches wide, terminal leaflet larger and more rounded than the others. A large tree. Specimens from Trinidad.

"Logwood," "Bois de Sang," "Bois de Campêche," "Campeach," "Palode Campêche," "Pao," "Pas," "Bluholy."

Haematoxylon Campechianum, naturalized in the West Indies, cultivated in many tropical countries. The fruit oblong-lanceolate, 1½-2½ inches long, ½ inch wide, thin, papery, few seeded, dehiscing up the centre. Inflorescence in short axillary racemes, abundant, flowers very small, yellow. Foliage small, pinnate, obovate, emarginate, in 4 pairs, 1-1⅛ inches long, ½-¾ inch wide. The tree of medium size, stem rugged of many angles; wood very hard of a dark blood-red colouring, producing a dark coloured dye much used in dyeing textile fabrics. Specimens from Botanic Gardens.

"Wild Indigo." *Indigofera Anil*, an indigenous shrub growing wild in pastures. Fruit produced in masses, very small, only ½ inch in length, incurved, rounded, on 2 inches long, sesstle, racemes, dehiscent when very dry, seeds very small pin-head like, black. Foliage pinnate, 4 inches long, leaflets in 8½ pairs, one inch long by 5/16 inch wide. Inflorescence in axillary upright racemes, flowers very small, pink. Specimens from wild lands.

"Mysore thorn, "*Pithecolobium dulce*, imported from India. The fruit at least 6 inches long but twisted into a spiral of 2 inches deep, less than ½ inch wide, constricted between the seeds, dark brown dehiscing when ripe, sheeding the seeds, 5 or 6, small, dark brown or black with a white one which often hang to the open valves. Inflorescence in string-like terminal racemes; flowers very small, greenish white. The roots have a strong acrid smell, particularly noticeable after rain. In India it is said to be largely used for making impenetrable hedges as the

branches are thorny; here it grows rapidly into a large tree. Specimens from the Botanic Gardens.

Acacia Smithiana, from the Southern Seas. Fruit a cork-screw bean, very similar to the last named species, dehiscing, screwing and reflexing into a spiral to 1½ inches long; seeds small, black. Inflorescence amongst the terminal leaves on short racemes with tiny yellow flowers. Foliage 5-6 inches long, 1-1¼ inches wide, pale green, with several longitudinal ribs, kidney-shaped, pointed, the under edge almost straight. A loose growing medium sized tree with long pendant branches. Specimens from the Botanic Gardens.

"Cassie," "Casse du levant," "Popanax," "Eree-babula," "Flor de Aromia," etc..

Acacia Farmesiana, cosmopolitan in the tropics. Beans dark brown, leathery, 2½ inches long, ⅜ inch diameter, falcate, rounded, sutures well defined, indehiscent, easily decaying. Seeds many, small, dark brown, each in a separate compartment. The plant is a scrambling hard-wooded, thorny shrub with very small pinnate foliage. Flowers yellow in small balls, strongly perfumed. The flowers have been largely used—and probably are so used now—in preparing perfumes. Much gum of a dark brown colour excudes from the stems and branches. Specimens from Botanic Gardens.

"Kentucky Coffee bean," *Gymnocladus canadensis*. Beans dark brown, 5½ inches long, 1½ inches wide, ¼ inch thick, slightly falcate, both sutures very plain, indehiscent. Seeds 5-6, dark brown, rounded, depressed, ¾ inch wide each way, ¼ inch thick. Specimens sent to me from Canada. The small plant grew in the Botanic Gardens for a few years but ultimately died.

Camoensia Maxima from Tropical Africa. Fruit 6-6½ inches long, 1½ inches wide across the seeds, one inch at other parts irregular in form, brown tomentose; in some a seed is at the end, in others in the middle, dehiscing suddenly ejecting the seeds. Seeds of a polished brown, an inch by ¾ inch and ⅜ inch thick. Foliage tripoliate; leaflets entire, oblong, pointed, edges wavy, dark shining green, 5 inches long, 2½ inches wide; 2 minute hair-like stipules at base of leaflets, and 2 strong recurved thorns at base of leaf stalks. Inflorescence a terminal raceme

with large white flowers with a yellow centre. Flower tube 4 inches long, brown; calyx spreading, green inside, 3 narrow and one wide double segments ; corolla with one broad spathulate petal, ribbed—exactly the form of an English plantain leaf—6 inches long, 4½ inches broad, of a crêpe texture, and 4 narrow spathulate petals 4 inches long, 1 inch wide; edges of all petals crimped. Stamens white (10) confluent at the base, 3 inches long with black anthers; pistil green, 4 inches long with black stigma. A strong growing scrambler, a splendid plant for forming an impassable barrier trained on a fence. The large white flowers are very conspicuous on the dark shining foliage. Specimens from Trinidad.

Saesalpinia digyna, East Indies, Malaya Beans 2 inches long, ¾ inch wide, recurved, edges prominent, leathery, 2-4 seeded, depressed between the seeds, indehiscent, brown, easily decaying. Seeds dark brown or black, round, ¼ inch diameter covered with a sticky substance. Foliage bipinnate with 10 or 12 pairs of pinnae, leaflets of about 10 pairs, very small; sharp short recurved spines in pairs about ½ inch apart occur on the leaf-stalks. Inflorescence terminal and axillary in small compound racemes; flowers small, yellow. The fruits are most useful for tanning purposes. A large scrambling shrub with short recurved spines on every part. Specimens from Trinidad.

The "Tamarind," *Tamarindus indicus,* introduced from the East Indies, naturalized in the West Indies and cultivated in all tropical countries. Seed specimens only. Seeds hard, dark shining brown, more or less square and angular, ½ to ⅝ inch by ½ inch, ¼ inch thick compressed, with a shield-like impression on both sides, bluntish top and bottom, often with a deep notch. The fruit is a pulpy bean with a brittle brown skin, indehiscent, but decays easily when fully ripe, often breaking in its fall, 4-8 inches long, ¾ inch to 1¼ inches wide and ⅝ inch thick, curved; 3 long fibrous strings run under the skin from stalk to point, holding the mass of pulp together as it were; 5-6-9 or 10 seeds according to the size of the fruit, each seed enmassed in a juicy brown pulp and a separate tense parchment-like skin next the

variegated. Foliage pinnate of 12 pairs of tiny leaflets, deciduous. A large tree with a stout rough-barked stem of hard wood, slow growing; the young branches long and slender, often whiplike. The ripe beans after being shelled form a much appreciated sweetmeat by preserving the whole pulp in syrup. Selected as to size, the seeds make handsome necklaces and even watchguards, both of which I have seen in Canada.

"Crab-eyes," "Jequinity seeds," "Ratti-weights," "Weather plant," "West Indian Liquorise." *Alnus precatonius*, cosmopolitan in the tropics. Fruit borne in close bunches beans 2 inches long; ½ inch wide, slightly constricted between the seeds, dehiscent, holding the seeds on the valves. Seeds 5 or 6 to each bean, quite small, round, of a shining scarlet and a black spot at the base. A twining shrub with very small pinnate foliage of a pale green, which has a strong liquorice taste when chewed. Flowers in small fascicled racemes, rosy. Seed specimens from Essequibo. A variety of this species with pale yellow or cream coloured seeds is growing on the plant house in the Botanic Gardens.

The "Sword bean," "Jack bean," *Canavalia ensiformis* cosmopolitan in the tropics. The beans 12-14 inches long, 1¼ inches wide, ¾ inch thick, pale brown, both sutures well marked, 2 prominent ribs by the side of the ventral suture, point reflexed, sword shaped, indehiscent, but easily decaying as the material is rather soft. The seeds—about 12, are large, ovoid-oblong, white, with a brown raphe, lying in a bed of whitish tissue. Foliage 3-foliolate, leaflets large, ovate or ovate-oblong; the inflorescence axillary, in long racemes, a few purplish flowers at the end. A strong twining vine which will grow to 10 or 12 feet high, though in Trinidad it only grows to about 3 feet or so high and is there treated as a small bush. This is a most useful plant for close planting and eventually digging into the soil as a soil improver for which purpose it was first imported. It is also a most useful vegetable. Used young, before fibre has formed in the beans, it is an excellent green vegetable, cut up and treated as French beans. When the beans are "full" the seeds may be shelled out and used as "Harricot," and even the ripe seeds can be used in the same way, but as the skins are

tough they must be slipped off before using. When this bean was first introduced it had the reputation of being poisonous, but that has been abundantly proved falacious and both beans and seeds may be indulged in without fear. Specimens grown by myself.

Pterocarpus macrocarpus one of the Gum Kino trees of India. Fruits circular, indehiscent winged beans, $2\frac{3}{4}$-3 inches in diameter, central portion with seed $\frac{3}{4}$ inch, remainder a parchment like wing all round. A tall tree with long pendant branches. Foliage pinnate, of 11 alternate leaves, the under side very pale. Inflorescence in short axillary racemes, flowers small, white. Specimens from Botanic Gardens.

Pterocarpus marsupium. Dragon's-blood tree from India. The fruit of this is very much like the foregoing but only half the size. Foliage pinnate, irregular, of 6 or 7 leaflets, oblong, emarginate $4\frac{1}{2}$ by $2\frac{1}{2}$ inches, glaucous beneath. Inflorescence in terminal panicles; flowers small, yellow. Specimens from Trinidad.

Crudya obliqua, indigenous. Fruit a one seeded, dehiscent bean, $1\frac{1}{2}$ inches long, an inch wide and $\frac{3}{4}$ inch thick, wedge shaped, dark brown, crinkled all over, the seed filling the entire space in the shell. Foliage pinnate of 3 leaflets, these alternate, 4 inches long, 2 inches wide, (many smaller,) unequal sided, dark green, glaucous beneath, mid-rib pale green. Inflorescence terminal, racemose. A large spreading tree. Specimens from Gardens, seeds brought there from Suddie.

Crudya oblonga, of the West Indies. The fruit a one-seeded, indehiscent bean, though easily decaying, 4 inches long, $2\frac{1}{2}$ inches wide, and one inch thick, with a decided sharp nose at the apex, and curved lines running from apex to the stalk; the seed large, brown, entirely filling the case. Foliage dark shining green, with two pairs of leaflets, oblong, 4-6 inches long, $2\frac{1}{2}$-3 inches wide, unequal sided, mid-rib prominent. Inflorescence a terminal panicle with straight branches 3 inches long. Flowers very small, white. A large tree with strong spreading branches. Specimens, Trinidad.

Amherstia nobilis, from Burma. Fruit, rarely produced,—

point recurved, 1-1½ inches wide, dorsal suture straight, ventral suture in 3 curves, middle curve inwards like a half-moon; the colour generally crimson when young, some greenish in middle with ragged edges, turning brown when full grown, 1-3 seeded. Inflorescnce a large, terminal, pendant, raceme, 2-2½ feet long, of some 20 flowers. The flower stalks and flower buds are of a vermillion red; open flowers 7 inches long, 3 of which is stalk. A pair of vermillion sepals, 2¾ inches long, 1 inch wide, elliptical, unequal sided; 3 petals, spathulate, 2 inches long, red with yellow points, tip broadly spathulate, centre cream coloured, sides pink with red splashes ⅞ by ¾ inch, and a crimson band across it. Stamens red with dark anthers. Foliage, pinnate 11-12 inches long, leaflets in 7 pairs, varying in size from 5½-8 inches long, elliptical pointed, 2-2¼ inches wide, dark green above, silvery beneath. A handsome well formed tree of medium height with loose pendant branches, introduced in 1837, then considered one of the most beautiful of plant introductions, its elegant foliage and its wonderful, pendant, enormous loose racemes of blossoms, like hanging scarlet swans is indeed a glorious sight. Specimens from Trinidad.

"Trisle," "Bois Mulatre," *Pentaclethra filamentosa*, of Guiana and the West Indies. Fruit 12 inches long, 1¾ inches wide, hard, woody, dark brown, streaked with cracking lines, dehiscent with a sharp report, ejecting the seeds, each valve reflexing and falling off, though sometimes remaining on the branch in a spiral. Seeds, 6 or 7, square, rhomboid or triangular, 1¼ inches long, ⅝ inch thick. Inflorescence a terminal panicle with straight branches 6 inches long, like spikes crowded with tiny greyish flowers. Foliage bipinnate of 16 pairs of pinnae 4 inches long, the pinnules in innumerable tiny oblong pairs of leaflets. A small low-branched tree. Specimens Botanic Gardens.

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"Donkey-Eye seeds," *Diocdea guianensis*. indigenous and West Indian. The bean dark brown, 5½ inches long, 2 inches wide, ventral suture broad, ¼ inch wide, straight, dorsal suture rounded. Seeds, 3-4, pale brown with dark brown specks and lines, black hilum, 1⅛ inches by 1 inch, and ⅝ inch thick, depressed, one side straight, the other rounded. Inflores-

cence a short terminal raceme with a few fairly large purplish flowers. Foliage trifoliolate, leaflets large, ovate. Specimens Botanic Gardens.

The "Puss-puss" flower, *Centrosema Plumierii*, indigenous. The bean dark brown, square with prominent ribs and long point, scimitar shaped, 5 inches long, sutures prominent, indehiscent. Seeds small, hard, yellowish brown, black speckled, black naphe. Inflorescence a short axillary raceme. Flowers large, $2\frac{1}{2}$ by $2\frac{1}{4}$ inches, emarginate, the double petal pink with centre of dark crimson, the keel white with crimson tips 1 by $1\frac{1}{2}$ inches. Foliage trifoliolate, central leaflet ovate, $4\frac{1}{2}$ inches long, $\frac{3}{4}$ inches wide, basal leaflets oblong, $3\frac{1}{2}$ by 2 inches. Stipules at base of leaflets. A fairly strong climber remarkable for its handsome flowers. Specimens Botanic Gardens.

Cassia moschata, from South America, deciduous. Beans 12-20 inches long, $\frac{5}{8}$ inch diameter, dark brown, very much like those of *C. javanica*, (*Marginata*.) Inflorescence on base secondary branches in grape-like racemes, 6 inches long. Flowers a deep orange and brown colour, produced just as the new foliage begins to expand. Foliage pinnate 10 inches long in $12\frac{1}{2}$ pairs of leaflets, these 2 inches long and $\frac{5}{8}$ inch wide. A large tree with strong main branches, the secondary branches limp and pendant. A beautiful object with its most peculiar colouring, contrasting vividly with the other cassias which are so brilliant with their masses of flowers. Specimens from Trinidad.

EXPORTS OF AGRICULTURAL AND FOREST PRODUCTS.

Below will be found a list of the Agricultural and Forest Products of the Colony exported during the first six months of the year 1919. The corresponding figures for the two previous and the average for the four years previous to that are added for convenience of comparison.

Product.	*Average 1913-16.*	*1917.*	*1918.*	*1919.*
Sugar, tons	34,215	52,696	34,867	37,167
Rum, gallons	1,900,522	1,718,069	1,547,526	3,036,093
Molasses, gallons	30,862	863	7,806	171,247
Cattle-food, tons	1,810	1,023	1,126	818
Cacao, cwts. ...	156	None	50	None
Citrate of Lime, cwts.	199	84	8	83
Lime Juice, gals....	No records	5,249	4,099	7,551
Essential Oil of Limes, gals.	No records	166	102	136
Coconuts, thousands	1,877	1,150	596	2,328
Copra, cwts. ...	872	451	1,452	864
Coffee, cwts. ...	1,856	1,863	1,432	7,128
Kola-nuts, cwts. ...	½	None	8	None
Rice, tons ...	5,175	9,602	6,643	1,288
Ricemeal, tons ...	395	49	5	None
Cattle, head ...	402	487	272	1
Hides, No. ...	2,143	1,153	1,316	3,769
Pigs, No. ...	712	455	None	None
Sheep, head ...	14	9	10	None
Balata, cwts. ...	4,320	4,378	2,373	2,262
Charcoal, bags ...	30,303	22,394	18,759	22,764
Firewood, Wallaba, etc., tons ...	3,852	5,002	3,790	4,339
Gums, lbs. ...	779	112	None	315
Lumber, cub. ft. ...	196,800	55,205	55,658	84,311
Railway sleepers, No.	1,621	16,413	6,000	1,508
Rubber, cwts. ...	¾	64	None	51
Shingles, thousands	1,102	1,418	1,181	1,336
Timber, cub. ft. ...	103,109	22,489	6,126	38,825
Coconut Oil, gals....	No records	11,913	20,344	4,451

ATTENDANCES AT THE DISTRICT GARDENS

Year.	Bourda.	Belfield, E. Coast.	Stanleytown, New Amsterdam.	Suddie, Essequibo.	Den Amstel.	Houston, E. Bank.	Wakenaam.	Total Attendances.
1912 ...	5,514	4,395	3,302	2,100	2,544	2,156	718	21,729
1913 ...	5,156	4,535	2,519	3,399	2,568	1,836	1,319	21,332
1914 ...	4,243	3,869	2,443	3,025	1,791	1,653	1,533	18,577
1915 ...	1,123	1,006	769	59	503	339	401	4,200
1916 ...	4,705	1,161	1,510	225	623	2,251	1,297	12,026
1917 ...	4,991	2,820	1,366	3,297	1,186	2,564	1,663	17,886
1918	4,834	3,081	1,653	2,671	2,162	2,790	2,067	19,258
1919								
1st Quarter	965	626	256	749	450	639	515	4,200
2nd Quarter	1,174	650	721	766	427	614	343	4,695

Meteorological Data—April-June, 1919.

Months.	Rain-fall.	NUMBER OF AYS OF RAIN						EVAP-ORATION	Air Temperature and Humidity.			
									Air Temperature			Hdt.
	Inches.	Under ·10 Inches	·10 to ·50 Inches	·50 to 1.00 Inches	1.00 to 2.00 Inches	Above 2.00 Inches	Total days.	Inches	Maximum	Minimum	Mean	Mean
Botanic Gardens												
April ...	10.76	2	15	5	3	.	25	4.19	84.3	76.1	80.2	81.4
Ma ...	23.38	4	9	1	6	4	24	3.35	8.40	76.0	80.0	85.1
June ...	7.11	6	15	4	.	.	25	4.65	85.0	75.5	80.2	80.1
Totals & Means	41.25	12	39	10	9	4	74	12.19	85.4	75.8	80.1	82.2
Onaer-neeming												
April ...	5.48	7	8	2	1	.	18		83.2	73.1	78.1	82.4
May ...	32.87	1	7	4	5	6	23		84.0	75.7	79.8	93.3
June ...	8.54	6	11	3	3	.	23		87.2	76.3	81.7	94.3
Totals & Means	46.89	14	26	9	9	6	64		84.8	75.0	79.9	90.0
Morawhanna												
April	9.77	7	11	1	3	1	23					
May	22.67	5	8	8	6	2	29					
June	23.61	3	12	8	3	4	30					
Totals & Means	56.05	15	31	17	12	7	82					